NISHAPUR
Glass of the Early Islamic Period

JENS KRÖGER



The Metropolitan Museum of Art

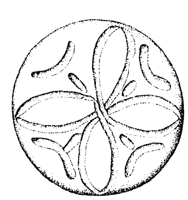
NISHAPUR
Glass of the Early Islamic Period

PUBLISHED WITH THE AID OF A GRANT FROM

The Hagop Kevorkian Fund, New York

NISHAPUR
Glass of the Early Islamic Period

JENS KRÖGER



The Metropolitan Museum of Art
New York

PUBLISHED BY
The Metropolitan Museum of Art, New York

John P. O'Neill, Editor in Chief
Barbara Burn, Executive Editor
Ruth Lurie Kozodoy, Editor
Pauline Di Blasi, Designer
Rich Bonk, Production

Typeset by Trufont Typographers, Inc., Hicksville, New York
Printed and bound by Malloy, Inc., Ann Arbor, Michigan

Photographs of Numbers 78, 82, 165, 182, 208 bottom, 214, 226, 228 center, 236, 247–292, and jacket photograph by Joseph Coscia of the Photograph Studio, The Metropolitan Museum of Art. Figure 1 map drawn by Kathleen Borowik, revised by Wilhelmina Reyinga-Amrhein. Figures 2–6 site plans drawn by Walter Hauser, inked by William Schenck. For complete information on photographs and drawings, see page 40.

LIBRARY OF CONGRESS CATALOGING-IN-PUBLICATION DATA

Kröger, Jens.
Nishapur : glass of the early Islamic period / Jens Kröger.
p. cm.
Includes bibliographical references (p. – and index.
ISBN 0-87099-729-7
1. Glassware, Islamic—Iran—Nīshāpūr. 2. Glassware, Medieval—Iran—Nīshāpūr. I. Title.

NK5108.9.K76 1995
748.2955'92—dc20 94-32633
CIP

Jacket illustration: Jug, wheel-cut colorless glass, Nishapur, 10th century; Cat. No. 228

This book is dedicated to
the memory of Charles K. Wilkinson
and the members of the Iranian Expedition
of The Metropolitan Museum of Art
whose paths crossed mine at Ctesiphon,
Walter Hauser and Joseph M. Upton.

Contents

Director's Foreword

Nishapur was one of the most splendid cities in medieval Iran and a vigorous center of Islamic culture. Founded in the eastern province of Khurasan during the Sasanian dynasty, it became the capital of the Ṭāhirid dynasty in the ninth century. Nishapur reached the height of its prosperity under the Samanids in the tenth century, when it served as capital for the governor and commander in chief of the province. The city retained its importance after it came under the rule of the Turkic Seljuqs in 1038 and was occupied by that dynasty's first sultan. Subsequently sacked by the Oghuz in 1153 and damaged in a series of earthquakes in the twelfth and thirteenth centuries, it nevertheless remained an active urban center until its utter destruction by the Mongols in 1221.

It is thus for good reason that the site was chosen by the members of the Iranian Expedition of the Metropolitan Museum, Walter Hauser, Joseph M. Upton, and Charles K. Wilkinson. Nishapur was not only a city of political significance, as is well attested by medieval writers, but also a flourishing center for trade and for the skilled production of artwork and crafts. The Museum's excavations were conducted from 1935 to 1940, with a final season in 1947. Reports of the excavations appeared in the Museum's *Bulletin* in 1936 (September), 1937 (October), 1938 (November), and 1942 (April).

The Museum's intention had always been to publish the results of these excavations in full. Due to the untimely death of Walter Hauser and a change of course in Joseph Upton's career, it fell to Charles Wilkinson, who had also served as both curator and department head at the Museum, to oversee the task. The project commenced with his comprehensive 1973 publication, *Nishapur: Pottery of the Early Islamic Period.* In 1982 there followed a thorough treatment of the metalwork from the site, *Nishapur: Metalwork of the Early Islamic Period,* by James W. Allan of the Ashmolean Museum, Oxford. Wilkinson had finished a manuscript for the third volume at the time of his death in 1986, and his *Nishapur: Some Early Islamic Buildings and Their Decoration* appeared later that year.

This fourth volume publishes the Islamic glass excavated by the Iranian Expedition at Nishapur. Its author is Jens Kröger, curator at the Museum für Islamische Kunst, Berlin, who has also written on Sasanian stucco decoration (1982), Islamic glass in Berlin (1984), and the glass excavated at Ctesiphon (forthcoming). His meticulous catalogue of the Nishapur glass finds is accompanied by thoughtful discussions of style, technique, and influence; an analysis of the excavations; an overview of Islamic-period glass finds throughout the Near East; and full references to the relevant literature. This book makes a significant contribution to our knowledge about Nishapur and about glass production of the entire period.

The Hagop Kevorkian Fund provides the support that has made this entire series of publications possible. The Fund's long-standing commitment has assured that scholarly works on ancient Near Eastern and Islamic art continue to appear under the Museum's imprint. We are deeply appreciative of its generosity.

PHILIPPE DE MONTEBELLO
Director
The Metropolitan Museum of Art

Acknowledgments

In the late fall of 1984 I was at The Metropolitan Museum of Art studying the glass objects there from the Ctesiphon excavations, in preparation for writing a catalogue. During that visit Charles K. Wilkinson asked me if I would also be interested in working on the glass finds from Nishapur, and, honored by his request as well as intrigued by the idea, I readily consented. Klaus Brisch of the Museum für Islamische Kunst in Berlin agreed to my working on the project as soon as time permitted. The same wholehearted support was given by his successor, Michael Meinecke. A grant from the Hagop Kevorkian Fund made it possible for me to travel to New York in the fall of 1985 and conduct the research necessary for this publication, and now, some ten years later, I am finally able to present the results of my studies.

With deep regret I learned of Charles's death in April 1986. It was the loss of an admirable and amiable colleague and a great loss professionally as well, and many questions concerning the excavations remain unanswered.

I am profoundly grateful to a number of institutions and persons for their continuing support. Backing provided by the Hagop Kevorkian Fund made possible not only my work in New York but, ultimately, the publication of this catalogue. I would like to express my sincere appreciation to the Fund and especially to Ralph Minasian for all his help.

Although a number of the original drawings had unfortunately been lost, the expedition drawings and photographs remained the primary source of images. I thank Konstanze Kitt for skillfully inking the drawings and making a considerable number of new drawings. Her work too was made possible by the Hagop Kevorkian Fund.

Marie Lukens Swietochowski was in charge of the project at The Metropolitan Museum of Art. I would not have succeeded without her kind help. Many others at the Museum were also enormously helpful. My special thanks go to Marcel G. Berard and Barbara Rivolta. After the completion of the manuscript it was Stefano Carboni who read the first draft very carefully, made many valuable suggestions, and helped in all matters to do with the Museum. I am extremely grateful to him, as well as to Daniel Walker, who graciously agreed to this arrangement.

In Berlin my thanks go to Horst Bohnsack, Christa Kienapfel, and Eva-Lisa Richter for their help with the manuscript.

The interpretation of Islamic glass in general and Iranian glass in particular will become an easier matter as more excavation reports are published and more catalogues reveal the wealth of museums and collection holdings. Thus, my main aim has been to present in full the collectible data on the Nishapur finds. Although I was not able to study extensively the glass finds in the Iran Bastan Museum in Tehran, I am extremely grateful to Abdullah Ghouchani for making it possible for me to see some of the important glass vessels in the museum in 1992. Particular thanks go to Robert H. Brill of The Corning Museum of Glass for his substantial appendix, and to Ruth Sprague for her help with it. Dr. Brill's study, based not entirely on glass finds from The Metropolitan Museum of Art's expedition in Nishapur but on related material, is an important contribution toward an understanding of the composition of Islamic glass.

I am most grateful to a number of individuals who lent support during my work on this project. My very special thanks go to Prudence

Oliver Harper at The Metropolitan Museum of Art for allowing me to use freely her notes on Islamic wheel-cut glass. Many others helpfully provided literature or answers to my queries: Robert H. Brill, The Corning Museum of Glass, Corning, New York; Herbert Butz, Museum für Ostasiatische Kunst, Berlin; Sven Fortscher, formerly Martin-Luther-Universität, Halle; Lisa Golombek, Royal Ontario Museum, Toronto; Elizabeth Hylen, The Corning Museum of Glass; Marilyn Jenkins-Madina, The Metropolitan Museum of Art; Michael Rogers, the British Museum, London; Willibald Veit, Museum für Ostasiatische Kunst, Berlin; Oliver Watson, Victoria and Albert Museum, London. All are cordially thanked for their assistance.

Ruth Kozodoy's editing has turned a manuscript written in "German English" into a readable text and, finally, a book. I am much indebted to her and very grateful for the many suggestions she made and questions she posed on a variety of issues, which helped me make arguments clearer and avoid errors. Barbara Burn oversaw the project and assured that it proceeded smoothly. Pauline Di Blasi, the designer, transformed difficult material into a handsome book. Rich Bonk carefully guided the volume through its production. My sincere thanks go to them as well as to others for indispensable work: Alarik Skarstrom, the bibliography editor; Annie-Christine Daskalakis Mathews, who checked the notes; Andrew Christenson, the indexer; Joseph Coscia and the Photograph Studio of The Metropolitan Museum of Art; Steffie Kaplan; and John O'Neill and Gwen Roginsky.

Finally, I thank my wife, Gerhild, and my sons, Fabian and Malte, for their continuing patience and understanding.

JENS KRÖGER
Berlin
April 1995



Figure 1. Map of the Near East in the early Islamic period

Nishapur and Glass of the Early Islamic Period

During the years 1935–40, when Walter Hauser, Joseph Upton, and Charles Wilkinson were working in the field in Nishapur, very little was known about Iranian glass of the Islamic period. There was no reference work from which the excavators could gain an idea of the place their findings occupied in the history of Iranian glass.

However, it had long been known that in the time of the Sasanian empire, which preceded the Islamic period, faceted glass bowls, mostly of the hemispherical type, were cut with exquisite skill. Finds from Iran proper were lacking, but a bowl from the tomb of the Japanese emperor Ankan (ca. A.D. 550–600) now in the Tokyo National Museum, a bowl in the Shōsō-in treasury in Nara, Japan, a fragment from Chinese Turkestan, and other examples provided striking evidence that glass had been exported eastward from the Sasanian empire and illustrated the high level attained by the glass industry during the Sasanian period. In the West, Sasanian glass was familiar from a group of vessels in the Treasury of San Marco in Venice, which, it was thought, had been used as models by Byzantine glassmakers and had reached Venice after the sack of Constantinople in 1204. Despite these known examples, the assumption was that Sasanian glass artists had not passed their knowledge on to early Islamic artists.

True, it was recognized that Islamic glass artists reached a level of considerable craftsmanship during the ʿAbbasid caliphate in the ninth century. Discoveries had been made north of Baghdad in Samarra, which between 836 and 889 was the ʿAbbasid capital, and outstanding examples of Fatimid rock crystal objects from Egypt and of enameled glass of the thirteenth and fourteenth centuries from Syria or Egypt survived in European treasuries. Perhaps only one work could be regarded as an Iranian masterpiece, a wheel-cut bowl of opaque turquoise glass in the Treasury of San Marco in Venice that was said to have been given to the republic by a Persian ruler in 1472.[1] It had been assigned a variety of dates around the year 1000. Inscribed on the bottom of the bowl is a word that can be read as *Khurasan*; thus the bowl can be understood as being of Iranian workmanship and from that eastern province.

In 1929–30, when Carl Johan Lamm published his work on Islamic glass and rock crystal, the size and quality of the body of glasswork from Iran was still very much underestimated because only a small number of objects could be assigned to Iran with any certainty. Lamm very accurately dated the turquoise bowl from San Marco to the ninth century. However, he attributed it to either Iraq or Iran (Lamm, *Mittelalterliche Gläser*, pp. 158–59, pl. 58:23).[2] In 1931 he published some glass objects from the excavations in Susa, giving them a date not later than the tenth century. This small body of glass finds from the Sasanian and early Islamic periods hinted at the richness of the finds that would emerge during future excavations in Iran.

By 1934 Lamm had already completed his chapter on glass and hard stone vessels for *A Survey of Persian Art*, which was eventually

1. Until recently it was thought to have been presented in the name of Uzun Ḥasan (d. 1478), head of the Āq Quyūnlū tribe and at the time the most powerful leader in Iran; a treaty between him and the Venetians, against the Ottomans, had been concluded in 1470. However, good reasons for thinking that the bowl had already reached the Treasury of San Marco by 1204 have been put forward: see Shalem, "New Evidence."
2. References to sources are by shortened title. Complete citations will be found in the bibliography.

published by Arthur Upham Pope and Phyllis Ackerman in 1938–39. In it Lamm wrote: "The history of Persian glass is very incompletely known.... Scientific expeditions to Persia have brought back surprisingly little glass.... [He quotes Ernst Herzfeld,] 'Quantities of medieval glass are to be found at all sites of ruined cities in Persia...' [and rebuts], however these sites have not been excavated by trained archaeologists. Owing to these circumstances, the objects can hardly be considered representative of the whole range of production.... Hence Persia cannot apparently take a prominent place in the history of glass-making" (Pope, *Survey*, pp. 2592–93).

The plates accompanying Lamm's chapter included illustrations of the three important glass vessels from the Buckley Collection which Wilfred Buckley himself published in 1935 and again in 1939 (Buckley, *Art of Glass*, nos. 77–79). They consist of a bowl and a ewer with relief-cut decoration and a bottle with decoration in the slant-cut technique. Not scientifically excavated but acquired in Persia, all three vessels are of high quality. However, their date and provenance were an unsettled question, with a ninth- or tenth-century date being proposed and the provenance slowly being changed from Egypt to Iraq/Iran. In 1942 Robert J. Charleston suggested an Iraqi provenance for the Buckley ewer but thought the Buckley bottle and a fragment in Stockholm were from Iran (Charleston, "Group of... Glasses"). In 1953 Kurt Erdmann emphasized that the shape of the Buckley ewer was related to those of Sasanian vessels, indicating that it too was of Iranian provenance and should be dated at least as far back as the ninth or tenth century. Both Charleston and Erdmann arrived, independently, at the opinion that works of the high quality of the Buckley vessels might have sparked the outstanding Egyptian rock crystal industry of the Fatimid period (K. Erdmann, "Fatimidischen Bergkristallkannen," pp. 192ff.).

Besides these high-quality glass objects, Lamm had in 1935 published the Hannibal Collection. It included undecorated glass and for the first time offered an idea of the wide range of glass from the Islamic period in Iran. However, since this material had not been scientifically excavated it was difficult to date precisely, and little was known about provenance except that the fragments were said to come mainly from Rayy or Sāva (Lamm, *Glass from Iran*, captions pls. 10–45 passim).

This summarizes the state of knowledge at the time the Nishapur excavations were undertaken in 1935 by the Iranian Expedition of The Metropolitan Museum of Art. The first publication of excavation results concerning glass finds was in 1942, when the excavators reported on four of the more important glass vessels, Numbers 164, 202, 227, and 228 (Hauser and Wilkinson, "Museum's Excavations," pp. 82, 105, 106, figs. 33–35). A number of additional vessels (Nos. 92, 169, 203, 224, 225) were published by Wilkinson in 1943 in connection with a discussion of irrigation, water, and drinking vessels (Wilkinson, "Water," pp. 177, 181–82). In 1961 Prudence Oliver (Harper) included the beaker Number 192 in a paper on the development of Islamic relief-cut glass (Oliver, "Islamic Relief Cut Glass," pp. 18–19, fig. 19). The ewer Number 160 with applied decoration was published by Marie Lukens (Swietochowski) in 1965 (Lukens, "Medieval Islamic Glass," fig. 14). Two other finds (Nos. 171, 223) were included in a general survey of Islamic glass by Marilyn Jenkins in 1986 and were related to finds of glass cargo from the Serçe Limanı shipwreck (Jenkins, "Islamic Glass," p. 29, nos. 28, 29).

Thus, publication of the glass vessels from Nishapur was sporadic and gave no real sense of the variety of the actual finds excavated by the Iranian Expedition. While it was generally recognized that, in addition to the large body of pottery (which was published in 1973), objects of glass had been excavated, only a few of the more sophisticated finds were actually known. Similarly, excavations had been carried out at a number of other Iranian sites, such as Iṣṭakhr and Rayy (for which see below), but their results had not been published in detail.

During the period from 1945 until the Iranian revolution in 1979, numerous excavations were conducted. Those in Sīrāf, Susa, and Takht-i Sulaimān were of great significance (see below). Outside Iran, the excavations in Fusṭāṭ (Old Cairo) yielded a number of very important glass finds. These demonstrated that the Fatimid man-

ufacture of rock crystal objects had not necessarily been influenced by wheel-cut glass from Iran, as Charleston and Erdmann believed, because Egypt itself had such a tradition: superbly cut vessels of the eighth and ninth centuries can be seen as precursors of the Fatimid rock crystals. The Nishapur and Fusṭāṭ excavations also revealed that the center of early Islamic glass production—the ʿAbbasid court at Baghdad and Samarra in Iraq—had exerted a major influence in the provinces Egypt and Iran.

As a result of the many commercial diggings which took place within Iran in the period 1945–79, a large number of glass vessels of all periods entered private and museum collections. Numerous catalogues and articles were published that gave a good idea of this material.[1] Recently R. J. Charleston published a survey on Persian glass from the beginnings until the Islamic period which is based on the whole range of glass finds from Iran (Charleston, "Glass"), and Ralph Pinder-Wilson, writing one chapter of a general survey of glass, placed the glass from Iran in the British Museum in the context of the larger history of Islamic glass (Pinder-Wilson, "Islamic Lands"). The result is that a greater number of vessels from Iran are now known than from other Islamic countries. Most of these are said to be from northeastern Iran or, more specifically, from Nishapur or Gurgān. The state of our knowledge about glass from Iran has thus undergone a complete change. However, as with pottery finds of the early Islamic period, information on findspots is minimal. Moreover, these finds rarely encompass the whole range of glass vessels that were used, because very few of the simpler vessels entered the art market. Thus, while this material certainly gives a good idea of the variety of wheel-cut glass, vessels of less sophisticated manufacture are not as fully represented as their actual use would warrant.

Unlike commercial digs, the archaeological excavation of Nishapur yielded numerous glass objects of types that usually do not enter collections built up from the art market, affording a much better idea of the glass used in everyday life. Therefore the complete excavation results are extremely important, even though the excavations have not turned up finds representing all the different styles now known nor yielded exact dates for all the glass said to come from northeastern Iran. The finds are now in the collections of The Metropolitan Museum of Art in New York and the Iran Bastan Museum in Tehran.

1. To name but a few: *Glass... Smith Collection*; Oliver, "Islamic Relief Cut Glass"; K. Erdmann, "Neuerworbene Gläser"; *2000 [Zweitausend] Jahre*; Pinder-Wilson, "Cut-Glass Vessels"; Harden et al., *Masterpieces*; Saldern, "Sassanidische... Gläser"; *Tribute to Persia*, Corning; Saldern, *Glassammlung Hentrich*; Saldern, "Gläserner Schlangenkorb"; Pinder-Wilson and Ezzy, "Glass"; Hasson, *Early Islamic Glass*; Saldern, *Glas... Sammlung Hans Cohn*; *3000 [Dreitausend] Jahre*; Kröger, *Glas*.

Glass Outside Nishapur: Excavations in Iran and Abroad

What follows is a short survey of excavations grouped according to country or province. Since much of the material has not been properly published yet, detailed analyses are not offered here. Nor is the intention to give a complete survey; only those excavations with some relevance to the Nishapur finds have been mentioned.

From the Iranian finds, a pattern is discernible. Most excavations demonstrate that in the period of the ninth and tenth centuries and in some places possibly even the beginning of the eleventh century, glass vessels were produced and used extensively. Findings of simple types were widespread. The more sophisticated glass was found only in the important centers.

IRAN

Gurgān Province

GURGĀN The city of Gurgān on the banks of the Gurgān River, southeast of the Caspian Sea, was investigated through trial trenches dug by M.Y. Kiani in 1970–77. Large quantities of

glass sherds led two kilns in the vicinity of an industrial complex to be identified as glass kilns of the eleventh or twelfth century (Kiani, *Islamic City*, p. 39, pls. 33:2, 35:1). Only a small number of the actual glass finds were published. There are a few decorated pieces, but most of the glass objects are simple free-blown bowls and bottles. The predominant color is green, mainly shades of olive green, although some vessels are of yellow-tinged, blue, or brown glass (Helen A. Kordmahini, "The Glass," in Kiani, *Islamic City*, pp. 81ff.). The finds from Gurgān have been dated to the eleventh to twelfth century, the Seljuq period, during which the city is said to have reached the high point of its development.

SHAH TEPE Excavations conducted at Shah Tepe in 1933 by the Sino-Swedish Expedition under Ture Johnsson Arne mainly had to do with pre-Islamic material. The Islamic finds were dated to the early Islamic period (Arne, *Excavations*, pp. 34–36, pls. 82–84).

Remains of over two hundred glass vessels were found, mostly loose finds and therefore unstratified. They are simple household glass: bowls, bottles, and ewers. Many bowls have rims thickened by folding of the glass. The colors reported are green, light to dark, and also yellowish; and occasionally blue, dark blue, or brown. Green is the most common color by far. Most finds are free-blown, but mold-blown vessels with patterns of ovals or flutings and vessels with applied threads also occur.

TŪRANG TEPE Excavations were conducted at Tūrang Tepe in Gurgān Province from 1960 to 1977 under J. Deshayes. Relevant to the Nishapur glass are the findings of Period VIIc, datable to the ninth and possibly the tenth century. As is usual with Islamic material, the finds came from a series of pits.

The glass finds consist of different types of bowls, small and larger bottles, and a small ewer. Most are plain, but a few pieces are mold blown. The glass is usually green and is blown out thin-walled. The rims of the bowls are sometimes thickened, usually folded outward—rarely inward. The mold-blown decoration consists of dots, roundels, hexagons, or a herringbone pattern. One beaker seems to have an engraved pattern of continuous facets. On the evidence of ceramics found with them, the glass finds are datable to the eighth or ninth century, conceivably reaching into the tenth century (Deshayes, "Rapport," p. 144, pl. 1a; Boucharlat and Lecomte, *Fouilles*, pp. 178–82).

Kirman Province

GHUBAYRĀ Excavations under Geza Fehérvári and David H. Bivar at the medieval Islamic site of Ghubayrā in Kirman Province began in 1971. Of the glass finds now being studied, a few bottles and a jug were published in preliminary reports: some are plain vessels, some mold blown or with cut decoration. While certain of these vessels are of well-known types, others have features rarely seen in objects from other sites, possibly a sign of regional differences (Bivar and Fehérvári, "Ghubayrā," *Iran* 10, pp. 168–69, and *Iran* 11, pp. 194–95, pl. 5a; idem, "Excavations at Ghubayrā, 1971," p. 141; idem, "Qobeyrā 1974"; Bivar, "Ghubayrā 1976"). Information on such subjects as the range of glass colors and the date of the finds will not be available until the final results are published.

SĪRJĀN Sīrjān was the Sasanian and early Islamic capital of Kirman Province. It reached its zenith under the Buyids in the tenth and early eleventh centuries. During surveys made in 1970, Andrew Williamson observed the remains of perhaps as many as seventeen glass furnaces within the walled city, ranging in date from the Ṣaffārid to the Buyid period. A time frame of about 950–1050 was given for the manufacture of the bulk of the excavated pottery (Williamson, "Regional Distribution"; Morgan and Leatherby, "Excavated Ceramics"). The glass finds have not been published.

Fars Province

IṢṬAKHR The results of excavations carried out at Iṣṭakhr by Herzfeld in 1932 and 1934 and by Erich F. Schmidt in 1935 and 1937 have not been

published. This Islamic city's period of greatest prosperity was between 800 and 1150 (Whitcomb, "The City Istakhr"); thus, information on its glass finds would be of considerable importance for evaluating the Nishapur finds. According to Schmidt, a number of vessels and objects of glass were found (E. F. Schmidt, *Treasury*, p. 118). The few sherds I was able to see in the Oriental Institute in Chicago range from the Sasanian to the tenth-century Islamic period. The glass color varies between yellowish green and colorless.

QAṢR-I ABŪ NAṢR The Persian Expedition of The Metropolitan Museum of Art excavated at the site of Qaṣr-i Abū Naṣr near Shiraz from 1932 to 1935 with the same team that subsequently worked in Nishapur. It was possible to date the glass finds, which come from the fortress and the western area, to the late Sasanian and early Islamic periods. The glass colors are green, light green, and colorless, with a few blue pieces. While some of the objects have parallels in Sasanian Mesopotamia, the glass finds with applied decoration show Syrian influence (Whitcomb, *Before the Roses*, pp. 154–55, figs. 26, 58, 59, pls. 43–45). Hardly any of the glass is closely related to the Nishapur finds. However, some bowls and bottles have the shapes of early types of vessels occurring in Nishapur, pointing to a continuity between Sasanian and early Islamic production. Much of the glass has thicker walls than the Nishapur finds. Unfortunately, few photographs of the finds were published.

SĪRĀF The port of Sīrāf, situated on the Persian Gulf, was excavated between 1966 and 1973. Sīrāf played a crucial role in maritime trade, mainly between 950 and 1100. A publication of its glass finds, scheduled for the near future, will be of great importance because most of the glass is said to be securely stratified. In addition to local glass there is a group that was classified as of East Persian type and that appears comparable to the Nishapur finds. It is made up of fragments of colorless glass with cut decoration that belonged to beakers, bottles, and flasks (Whitehouse, "Excavations," 1968, pp. 18–19, and 1970, p. 6, p. 12a, p. 18, pl. 12b).

Khūzistān Province

SUSA Many excavations have been undertaken in Susa since the first one conducted by William Kennett Loftus in 1850–53. More than forty glass finds of the French Expedition under Marcel-Auguste and Jane Dieulafoy (1884–86), Jacques de Morgan (1897–1910), and Roland de Mecquenem (1908–14, 1920–33) were published by Lamm in 1931 (Lamm, "Verres . . . à Suse," passim). They range from the late Sasanian period to the tenth century, most finds dating between the eighth and tenth centuries. Since 1974 Monique Kervran has published regularly on the excavations conducted in Susa in 1972–76 (Kervran, "Niveaux islamiques," 1977 and 1984; Kervran, "Une Sucrerie," pp. 184, 224, fig. 72, p. 226, pl. 18b–c; and see also Hardy-Guilbert, "Niveaux islamiques," pp. 143, 194–95, fig. 31, pp. 196–97, fig. 32, p. 198, fig. 33, p. 209, pl. 6). In 1984 Kervran published glass finds excavated from the eastern part of the Apadana mound during those years. Glass was also found in pits. Associated coin finds indicate that the glass is principally from the ninth and tenth centuries. Unlike the Nishapur glass, the finds from Susa are mainly types of glass for daily use, and high-quality objects are rare. The predominant color is brownish. While a number of vessels can be compared with the Nishapur finds, certain types, such as footed goblets, seem to have been more popular in Susa than in Nishapur and show similarities to finds of the same period from Mesopotamia. This is also true of a number of bowl and bottle shapes.

Azerbaijan Province

TAKHT-I SULAIMĀN Excavations at Takht-i Sulaimān in Azerbaijan, carried out beginning in 1960 under Rudolf Naumann and later under Dietrich Huff, have yielded a considerable quantity of glass finds dating from the Sasanian to the Īl-Khānīd period.

The glass colors are light and dark blue, light and dark brown, colorless, dark manganese, black, and all shades of green. Large quantities of molded glass were found, mainly belonging

to beakers or bowls of varying shapes. Most of them are green, with a good number of blue-green. A few bowls datable to the tenth century have been published (Schnyder, "Keramik"; Naumann, *Takht-i Suleiman*, nos. 64–66; *Islamische Kunst: Verborgene Schätze*, nos. 38–40, 203). It is usual for the rim of the vessels to be folded outward or inward. Herringbone patterns occur in addition to dots and ribbing. Besides the large number of mold-blown fragments, pinched, incised, cut, and engraved and painted glass pieces were found. The Takht-i Sulaimān finds differ considerably from the Nishapur glass in that they include a large quantity of mold-blown glass and a wide range of glass colors. It seems that colorless glass with cut and engraved decoration was much less common in Takht-i Sulaimān than in Nishapur.

ʿIrāq-i ʿAjamī Province

RAYY Excavations in Rayy conducted in 1934 under Erich Schmidt on behalf of the University Museum in Philadelphia and the Museum of Fine Arts in Boston seem to have produced numerous glass finds that are still to be published. Schmidt mentioned that "glass vessels are frequent in the early and middle Islamic strata," that is, the time of the ʿAbbasids and Seljuqs. As in Nishapur, many finds came from "ancient wells, sewers and trash holes" (E. F. Schmidt, "Persian Expedition," pp. 48, 49). The glass from Rayy, one of the capital cities in the region, promises to be important for understanding the Nishapur finds and will probably reveal remarkable similarities. However, because the Rayy excavations were not as extensive as the Nishapur campaigns, further research would be desirable.

IRAQ

SAMARRA Excavations in Samarra, for a time the ʿAbbasid capital, were undertaken in 1911–13 (see Lamm, *Glas von Samarra*, passim) and in 1936–39 (see *Excavations at Samarra*, part 2, pls. 106–27). The catalogue by Lamm is the first report on glass from an Islamic excavation. Unfortunately, only a small number of the finds are illustrated, and only in a drawing. The report of the 1936–39 excavations reproduces photographs of the glass found, but just a summary text is provided. Therefore, comparison of the finds from the two excavations is difficult. Recent excavations are not considered here, since no comparable material has been published.

The glass finds from the Samarra excavations are extremely important because they form a body of material with close resemblances to the glass finds from Nishapur. Wilkinson's statement, "There was great influence from Iraq, where the caliphate was seated from the middle of the eighth century. During this time, and throughout the ninth century, Iraq was in closer touch with Nishapur than was the case later" (Wilkinson, *Nishapur: Pottery*, p. xlii), remains valid, as many similarities in the shapes and decoration of vessels demonstrate. There are instances where designs from the two sites seem indistinguishable, and most styles that appear in Samarra have a counterpart in Nishapur. Detailed study shows that certain stylistic tendencies manifest in Nishapur, especially in cut and engraved glass, could well have derived from styles practiced in Samarra. Art produced in the ʿAbbasid capital certainly mattered a great deal to those in provincial capitals like Nishapur and influenced artists in other centers as well. The glass finds from Samarra are all the more important because most of them can probably be dated to the main occupation level of the ninth century. Doubts about the dating of the ceramics have been voiced (Whitehouse, "Islamic Glazed Pottery," pp. 59–60). However, research on the site of Samarra has provided new evidence that the caliphal capital was in decline by the late ninth century (Northedge, "Creswell," pp. 74–79), a fact that joins the external evidence of glass finds from China to support a ninth-century date. There is no reason to reconsider this dating until the new results of a stratified excavation in Samarra are published. For the settlement pattern and dates of Samarra, see Northedge, "Creswell," pp. 78–79, 83, 92 n. 49.

CTESIPHON/AL-MADĀʾIN With the participation of The Metropolitan Museum of Art and the Berlin State Museums, the site of the Sasanian capital Ctesiphon and the later Islamic city al-Madāʾin was partly excavated in 1928–29 and again in 1931–32. The excavations yielded evidence, in the form of cullet (broken glass for recycling) and slag (chemical waste), that glass had been produced in the area. The glass finds are from the Parthian, Sasanian, and Islamic periods and therefore give a clear picture of the continuity of glass production in central Mesopotamia during this entire time. The largest number are from the Islamic period and are datable to the seventh to tenth century, partly overlapping the time period of the Nishapur finds. Some of the glass types closely resemble ones from Nishapur (e.g., cylindrical bowls and small or large bottles), but much less wheel-cut glass was found here than at Nishapur. While this may be a regional variation, the difference is probably due to the fact that the city of al-Madāʾin was less important than Nishapur or, for that matter, Samarra. The glass colors include different shades of green, and some of the better-quality vessels are of colorless glass, as at Nishapur. Green glass with a yellowish tinge continues from the Sasanian era; this color is rare in Nishapur. Dark blue and aquamarine glass are much more common than at Nishapur. The Ctesiphon glass finds were first published by Puttrich-Reignard, but without illustrations (Puttrich-Reignard, *Glasfunde*). A new publication is forthcoming (Kröger, *Parthisches . . . Glasfunde von Ktesiphon*).

ARMENIA

DWIN Dwin, one of the largest cities of medieval Armenia, deserves mention because of the abundance of its glass finds, published in 1974 and, along with additional finds, again in 1988 (Janpoladian, *Medieval Glassware*; Janpoladian and Kalantarian, *Trade Relations*). Excavations, undertaken in 1937 and still proceeding, have unearthed quantities of glass objects, mainly of the ninth to the thirteenth century. Sasanian-type faceted bowls that were found are said to come from layers of the eighth to ninth century. For the glass colors the following percentages were reported: green, 39 percent; colorless, 36 percent; blue, 6 percent; black, 4 percent; and manganese-red, 2 percent. In addition to free-blown vessels, the products of mold-blown, pinched, applied, incised, and wheel-cut techniques are among the finds. The shapes include bowls, bottles, ewers, lamps, alembics, and cupping glasses. Window glass was excavated, the round disks generally 18 to 22 centimeters in diameter, some 27 centimeters. Glass cubes for mosaics begin in the seventh century, and bracelets are numerous from the tenth to the thirteenth century. Beads were also found.

Glass was obviously manufactured in the city of Dwin, although glass kilns were not found. Glass of high quality is also said to have been imported from neighboring Islamic countries. During the eighth and ninth centuries glass was imported from Iraq and Iran. In the tenth and eleventh centuries the production of Dwinian workshops increased, new shapes and thinner-walled vessels were introduced, and the glass composition differed from that of previous centuries; during that time the city's political inclination was to the West (Byzantium and the eastern shores of the Mediterranean). It is noteworthy that two beakers with flaring sides found in Dwin have patterns identical to those on vessels from the Serçe Limanı shipwreck. They may all be from the same workshop (Kitson-Mimmack, "Glass Beakers," p. 233). In the twelfth and thirteenth centuries enameled glass was imported from Syria. Stylistic differences make it clear that none of the finds from Dwin were imported from Nishapur.

TRANSOXIANA

As with ceramics—where resemblances between Nishapur pieces and those discovered at Afrāsiyāb/Samarkand, Merv, and Tashkent were noted by Wilkinson—so with glass, the objects

excavated in Transoxiana have much in common with the Nishapur finds. However, unlike the ceramics, the glass is little known. Material has been published from only a few sites, the most prominent of them Khulbuk in Tadzhikistan (Gulyamova, "Steklo"). Finds in the Tashkent and Samarkand museums have also received some attention (Amindzhanova, "Srednevekoviye steklyanniye"; Abdurazakov et al., *Steklodeliye Srednei*; Abdurazakov, "Medieval Glasses"). On the basis of the few finds published so far, it is impossible to draw more than preliminary conclusions. There are some general correspondences of standard vessel types and of certain decorations, for example in mold-blown glass. Little information about high-quality glass has been published, and very few firm dates. The glassworkers of Transoxiana appear to have been more strongly influenced by Iranian glass than vice versa during the ninth through eleventh centuries. Much of the glass seems somewhat later than the Nishapur finds, but further reports are greatly needed. It is interesting that vessels with applied decoration appear to confirm the eleventh-to-twelfth-century dates ascribed to much glass of this type.

CHINA

Somewhat unexpectedly, the most important glass finds come from the region farthest from Nishapur. During the last decades many Islamic glass vessels have been found in China. Most of them are closely related to the finds from Nishapur; much of the Islamic glass from China is of Iranian provenance, and in some cases it may well be from Nishapur glasshouses. The finds from China are of great importance because they were unearthed in tombs or temple crypts, and thus they supply terminus ante quem dates. Some of the vessels may have been in China for a considerable period of time before burial, while others were probably buried shortly after arrival. The finds also show us which types of ware were traded to China. Whereas earlier only certain kinds of glass vessels, such as the fifth-to-sixth-century Sasanian faceted bowls, were known to have been traded to China and Japan, the new finds prove that almost all types of Islamic glass were exported. They range from simple undecorated bowls through vessels made in nearly all the known glass techniques—mold blown, pinched, applied, painted, incised, and wheel cut. Many of these finds have been published by An Jiayao (An Jiayao, "Dated Islamic Glass" and *Early Chinese Glassware*), but some still await publication. Perhaps the single most important group consists of glass finds from the crypt of the Famen Temple in the province of Shaanxi in central China, which was sealed in A.D. 874. The fact that the incised plates from that site seem especially close to the fragmentary plate Number 164 excavated in Tepe Madraseh confirms the ninth-century date proposed for it by the excavators. All other finds in China related to the glass from Nishapur will be mentioned in the sections that follow.

MEDITERRANEAN COAST

THE SERÇE LIMANI SHIPWRECK A ship carrying a cargo of Fatimid glass vessels and glass cullet sank off the coast of Turkey opposite Rhodes sometime between 1025 and 1030. It was excavated in 1977–79 by a team under the direction of George F. Bass (see Bass, "Nature of the Serçe Limani Glass"). The reconstructed glass finds include plates, cups, bowls, beakers, jars, bottles, ewers, and mosque lamps. Various techniques are represented, but principally moldblowing, applied decoration, and wheel-cutting. A study has been done of the flared beakers (Kitson-Mimmack, "Glass Beakers"). The glass from this shipwreck is quite important because it is datable. However, there are hardly any ties between Nishapur glass objects and the Serçe Limanı finds. For that reason, vessels from Nishapur cannot be dated on the evidence of the Serçe Limanı glass, as has been proposed (Jenkins, "Islamic Glass," p. 28, fig. 28). All details point to the conclusion that this ship carried glass and cullet for Byzantine glassmakers from Fatimid Syria to the Black Sea (Doorninck, "Serçe Limanı").

EGYPT

FUSṬĀṬ (OLD CAIRO) The excavations conducted in Fusṭāṭ since 1964 by George T. Scanlon have yielded a number of important glass finds which were published by Scanlon and Ralph H. Pinder-Wilson in 1973 and 1987 (Pinder-Wilson and Scanlon, "Glass . . . Fustat: 1964–1971" and "Glass . . . Fustat: 1972–1980"). A complete report is in preparation. The particular importance of these excavations rests on their yield of datable wheel-cut finds from the eighth to ninth century, a period hitherto not well documented in Egypt. The excavations show that in addition to simple wares, high-quality glass of a standard previously unknown in Egypt was made and used in Fusṭāṭ. There are many mold-blown vessels, but the wheel-cut vessels are of particular relevance to the Nishapur finds, as is also at least one cut glass find from the second half of the ninth century that seems to have been imported to Fusṭāṭ from Iran (Pinder-Wilson and Scanlon, "Glass . . . Fustat: 1964–1971," no. 15). Two other vessels with relief-cut decoration were perhaps also imported from Iran (nos. 17, 18); they are datable to about 900.

Glass was used in Fusṭāṭ for many different purposes and occurs in the usual types: bowls and dishes, beakers and goblets, jars, flasks, and ewers, alembics, window glass, weights, stamps, and jewelry. A large number of the shapes discovered have no immediate counterparts among Iranian glass vessels. Differences in the colors of the Fusṭāṭ glass correspond to differences in technique. Vessels of cut glass are transparent and almost colorless. The most common glass color, used for pattern-molded dishes and bowls, is colorless with a greenish blue tinge. Less common is colorless glass with a yellowish green tinge, often streaked with purple. Other transparent or translucent glass examples are yellowish green, cobalt blue, bluish green, amber, or ruby. Opaque glass also occurs.

Nishapur

HISTORY OF THE CITY

The medieval city of Nishapur, situated in the northeastern province of Khurasan, was the largest and most important metropolis in the eastern part of Iran on the Silk Road, which connected Baghdad, capital of the ʿAbbasid caliphate, with the cities of Merv, Herat, and Balkh to the east and beyond them, with India and China (Spuler, "Commerce").

Nishapur lies in a plain surrounded by mountains. Water reached the city and the surrounding farmland through a network of channels both above and under the ground. (Iran was famous for its *qanāt* technology, a system of underground canals.) The city's economy relied on manufacture, trade, and the farms around it.

Founded in the Sasanian period as Nev-Shahpuhr, Nishapur was the seat of a governor in early ʿAbbasid times. In the ninth century, under the Ṭāhirids (821–73), Khurasan became an autonomous province, and Nishapur was the capital of Ṭāhirid rule from 828 to 845. It was then that Nishapur began to develop into the literary and artistic center of Khurasan, a position it was to retain, even during periods when it was not the administrative capital and seat of political power in the east, until its devastation by the Oghuz and the Mongols in the twelfth and thirteenth centuries (Bosworth, "Capital Cities"). The Ṭāhirid dynasty was displaced in 873 by the Ṣaffārids. They were succeeded in Khurasan by the Samanids, a Persian dynasty, when Ismāʿīl was appointed governor by the ʿAbbasid caliph in 900. Although Bukhara was the Samanid capital, Nishapur prospered greatly in the tenth century during the Samanid rule; as an international trading center it seems to have flourished most during the last two centuries of the first millennium. Maḥmūd of Ghazna removed the Samanids and installed the Ghaznavid dynasty in Nishapur in 999. In 1037 the Ghaznavids were replaced by the Seljuqs, a dynasty of Turkish descent, under whom the city thrived for a considerable period. But the twelfth century brought political turmoil and

devastating earthquakes, and these, together with the Mongol invasion in 1221, put an end to the most important phase of Nishapur's history.

From mentions in literary sources it appears that Nishapur was a typical Islamic city. It is described as having had a citadel and an inner and an outer city; a Friday mosque, a government palace, and markets. The Silk Road reportedly passed through the center of the city with the streets crossing it at right angles. "Nishapur's wealthier families lived either in the garden areas of the south and southwest or along the stream flowing through the east side of town, while the poor clustered in the northwest" (Bulliet, *Patricians*, p. 13). According to the tenth-century chronicler Muqaddasī, Nishapur was the chief center for textile manufacture in Khurasan. The textile industry was extremely important, and consequently the cloth merchants of Khurasan achieved prominence and amassed the largest fortunes in trade (Bosworth, *Ghaznavids*, pp. 151–52). Besides textiles, the only industry mentioned is the forging of ironware.

The population of Nishapur reached perhaps one to two hundred thousand at its peak (Bulliet, "Medieval Nishapur," p. 88). The inhabitants were principally Persians, but there were Arab and Turkish communities as well. Since the city was the headquarters of the military governor of Khurasan, and the Samanid and Ghaznavid armies employed Turkish troops, probably most of the Turks were soldiers. Much of the Nishapur metalwork provides reasons to believe that Turks were integrated into the fabric of Iranian society in the ninth century. James W. Allan has shown that the important ninth-century sword from Nishapur is deeply rooted, both technically and stylistically, in Central Asian or Turkish culture, and the same can be said of the numerous equestrian accoutrements (Allan, "Nishapur Metalwork: Cultural Interaction," pp. 4–6). However, this is not the case with objects of glass.

While it is evident that the population of Nishapur was largely Muslim, communities of Christians, Jews, and Zoroastrians were also present. As architectural decoration and ceramic vessels attest, the Christian community used the symbol of the cross in numerous works of art (Wilkinson, "Christian Remains," pp. 79–87). However, not a single glass from the excavations can be connected with certainty to the Christian community, or indeed to any of the others. On an important beaker in The Metropolitan Museum of Art, possibly from Nishapur or the Khurasan region (Jenkins, "Islamic Glass," no. 26), a cross is incorporated in a way related to that of crosses on pottery (Wilkinson, *Nishapur: Pottery*, p. 52, no. 81; see also Ferrier, *Arts of Persia*, p. 259, pl. 11). It is too early to see this as a Christian vessel, however, for the cross may have been used purely as an ornament.

Although Arabs, Persians, and Turks all spoke their own languages, on the inscribed pottery Arabic overwhelmingly predominates. In his book on pottery, A. Ghouchani assembled inscribed pottery from or related to the Nishapur finds; 140 vessels carry more than 200 inscriptions, some of which appear more than once. The inscriptions are proverbs or popular sayings (*amthāl*, sing. *mathal*); maxims or aphorisms sometimes attributed to the prophet Muḥammad or to ʿAlī; and in some cases, expressions of individual wishes. There are twenty-six signatures giving the name of the artist, while other examples give the name of the person for whom the vessel was made. The name Aḥmad, for example, appears fifteen times (Ghouchani, *Inscriptions*, Index of Potters, p. 7; Sellheim, "Vier Miszellen," pp. 354–57). While not all of these objects are from Nishapur, the general conclusions to be drawn from them can justifiably be applied to the Nishapur findings.

Excavation finds show, not surprisingly, that glass vessels carried written messages far less frequently than pottery vessels did. Only two of the wheel-cut beakers have inscriptions, in Arabic (Nos. 191, 192). Impressed stamps were also inscribed, always in Arabic (Nos. 142–147). Inscriptions on glass vessels generally name the artist or owner or express wishes, while stamps usually give the name of the caliph. Inscribed wares were probably used by the Nishapur community regardless of creed and language; apart from differences in wealth, no societal distinctions concerning the usage of glass seem likely.

THE EXCAVATIONS

A trial dig was undertaken in Nishapur in August of 1935. Excavations continued during the spring of 1936 and for five months in the summer of 1937. Further campaigns, July to December 1938 and July 1939 to August 1940, came to an end because of the war. In 1947 a final season was conducted to solve one or two pressing problems; then the concession was surrendered.

The excavations were conducted at a number of sites, some more intensively than others. Although the hope was to discover structures corresponding to those named by early historians and travelers, "some of whom described the contemporary scene while others incorporated descriptions written in the past," wrote Wilkinson, ". . . a close association between named buildings and excavated structures cannot be made" (Wilkinson, *Nishapur: . . . Buildings*, p. 44).

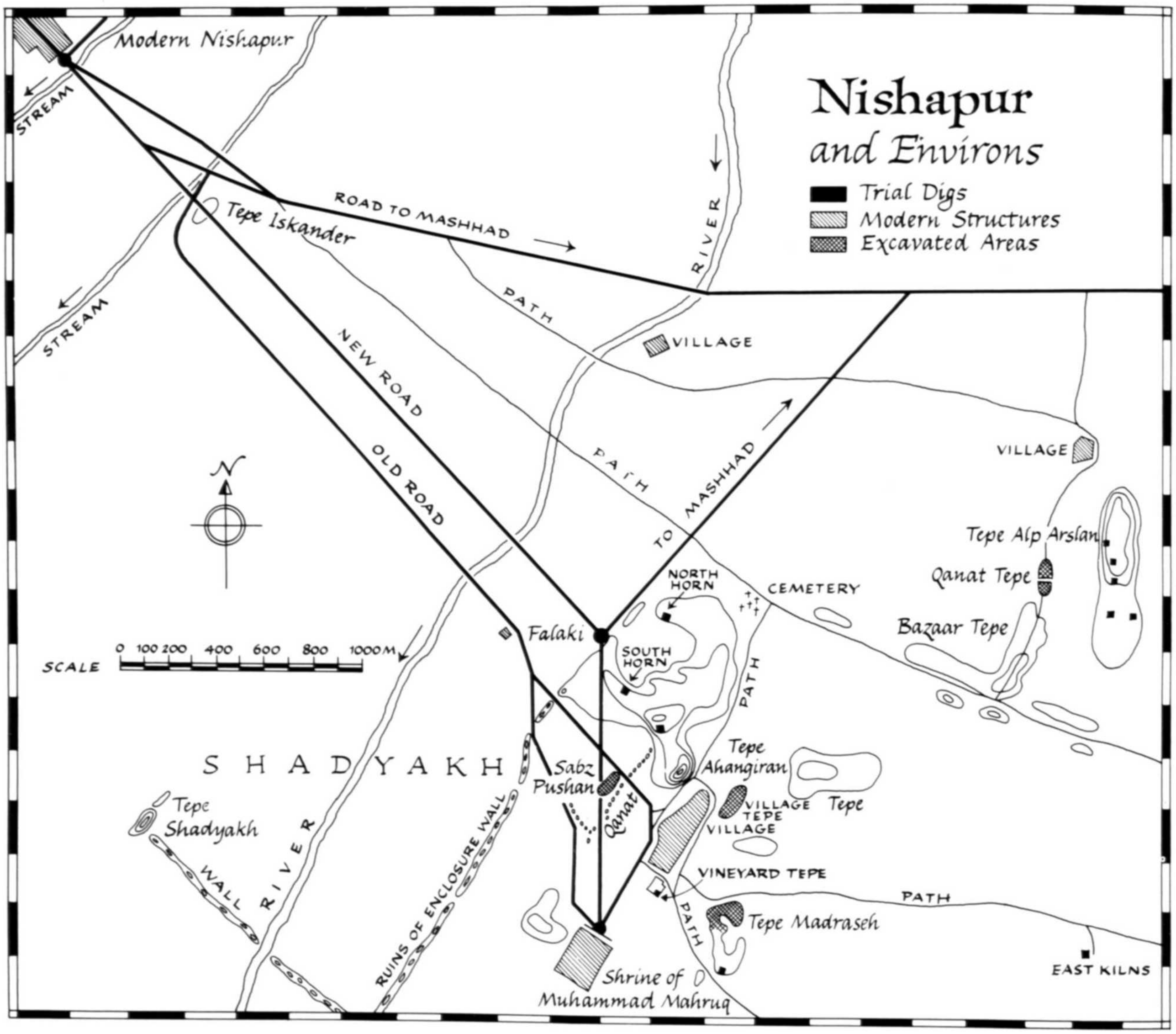
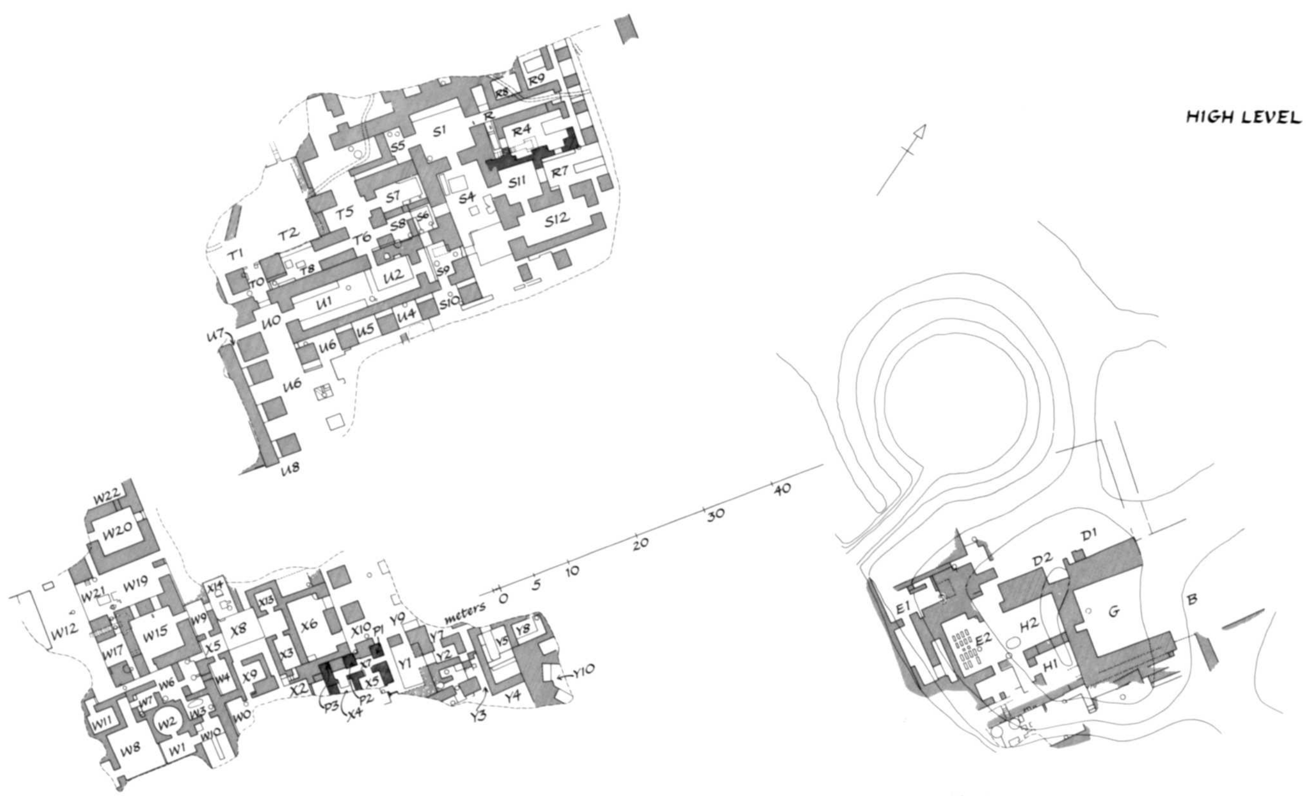


Figure 2. Map of Nishapur



Figure 3. Site plan of Tepe Madraseh


MIDDLE LEVEL
R6
R4
R5
S1
S5
R3
R1
R7
S7
S4
S11
T5
T6
S6
S2
S12
TO
T9
T8
S9
U2
U1
S10
UO
U5
U4
U6
U7
U6
U8
J1
W22
W20
X12
W19
W21
W18
X14
X13
X8
X6
X10
Y9
Y7
Y8
W17
W15
W5
X3
Y1
Y2
Y5
W4
X9
Y10
W6
W7
W3
W13
W2
X2
X4
X5
Y3
Y4
W8
W10
WO
W1
meters 0 5 10 20 30 40 50
C3
C5
C1
C2
D2
D1
A6
B
E1
G
H2
E2
H1


HIGH LEVEL
R8
R9
R
R4
S1
S5
S11
R7
S7
S4
T5
S8
S6
S12
T2
T6
T1
T8
U2
TO
S9
U1
S10
UO
U5
U4
U7
U6
U6
U8
W22
W20
40
30
20
10
5
0
meters
W19
X14
W21
X13
W12
W15
W9
X8
X6
X10
P1
Y9
Y7
Y5
Y8
W17
X5
X3
X7
Y1
Y2
W4
X9
X5
Y10
W6
X2
W7
W3
P3
P2
X4
Y3
Y4
W11
W2
WO
W10
W8
W1
D1
D2
E1
G
B
H2
E2
H1

TEPE MADRASEH Tepe Madraseh was the largest and most significant area excavated by the Nishapur expedition (see Fig. 3). Work started in 1937 and continued until August of 1940; the site had to be abandoned in 1947 and was later given over to commercial digging. The "architectural grandeur" of the buildings that once stood on the site shows that they were important (Wilkinson, *Nishapur: . . . Buildings*, p. 47). They appear to have constituted a large complex built around a courtyard. Revealed in the excavated areas was a stretch of secular buildings extending from the northwest part of the site to the southwest, and, in the northeast, a mosque. The secular buildings contained large halls and numerous rooms behind piers and corridors. Behind the *qibla* wall of the mosque were large rooms, including one interpreted as a kitchen. Next to the mosque (G) was a domed octagonal chamber (J1) with seven recesses, reached by a steep flight of stairs. Water emerged from a tunnel beneath the room and flowed into a tank.

As is to be expected, there was considerable destruction and reconstruction, with floor levels at differing heights. However, all the strata of the complex can be reduced to essentially three levels. Of the more than one hundred coins retrieved, eighty date from the late eighth and ninth centuries and twenty-six from the tenth century, when the Samanids ruled Khurasan (Wilkinson, *Nishapur: . . . Buildings*, p. 55). Although the site was never completely excavated, it is very probable that it was founded in the early ninth century. This date is also suggested by the stucco decoration found at the lowest level (ibid., pp. 145–46, figs. 1:163, 1:164). The principal period of habitation seems to have been the ninth and tenth centuries.

Parts of the complex were decorated with carved stucco, or plaster. Most of the carved decoration excavated in the secular part of Tepe Madraseh, interestingly enough, was found in one relatively small area, a group of rooms clustered around the south corner of the field inside the mound—the X and Y rooms on the low level plan (Wilkinson, *Nishapur: . . . Buildings*, p. 136). From some of these rooms, especially Y2, came high-quality pottery (ibid., p. 91). Also from Y2, from the lowest level, came the so-called Nishapur sword (Allan, *Nishapur: Metalwork of . . . Islamic Period*, pp. 56–57, no. 208), which was dated to the ninth century. The area yielded still more. "The most intriguing painting was discovered—in room W20. . . . There is every reason to believe that the decoration in all three of these rooms—S11, W2 and W20—was contemporary, and that it was done no later than the tenth century" (Wilkinson, *Nishapur: . . . Buildings*, p. 159).

Not just the layout of the buildings, then, but also the use of carved plaster and extensive wall painting suggest that "this was obviously no ordinary assembly of private dwellings but rather something of an official nature, a palace or a governmental center" (Wilkinson, *Nishapur: Pottery*, p. xxxii).

The excavations in Tepe Madraseh brought forth the largest number of glass finds and nearly all the other important finds at Nishapur. A total of 115 glass vessels or vessel fragments was registered, of which 13 are from the area of the mosque and adjoining structures. Since 9 of these finds are from room H4, from a low level in a well and a drain in the area near the kitchen,[1] the distribution in this section of the complex is small indeed. No glass was found in the mosque itself or in the adjacent underground room J1. A single but important sherd (No. 163) is from the vestibule of the mosque (G2). In the northwestern part of the complex (rooms R to U), 37 finds were made, largely concentrated in the rooms S4 (8 finds), S8 (5 finds), and T0 (9 finds). Most finds are from the southwestern complex (rooms W to Y); 65 glass finds were made there, perhaps indicating that this was an important residential quarter. Two rooms yielded the greatest number of finds, X8 (12 finds) and Y6 (21 finds). Unfortunately, the exact location of room Y6 is not given on the excavators' plan.

*Zir-i-zamin*s (underground rooms) do not play an important part in Tepe Madraseh; only one glass find is mentioned as coming from an underground room, S8. Most other finds in Tepe Madraseh are from wells, drains, and latrines.

1. Although Wilkinson's plan shows no low level for H4, objects are identified as coming from a drain and a low level of that room.

SABZ PUSHAN Tepe Sabz Pushan was the first Nishapur site to be excavated, in an effort that continued through three seasons, 1935–37 (see Fig. 4). Wilkinson described the finds. "The buildings in Sabz Pushan were on less grand a scale than those in both the Vineyard Tepe and Tepe Madraseh. The rooms were smaller, some no more than three meters square, and the walls less massive. The houses were arranged close together, and most of them had small interior courtyards. A narrow *kucheh*, or alleyway, ran through the dwellings in the excavated area" (Wilkinson, *Nishapur:...Buildings*, p. 219). "Many of the rooms had a fireplace.... Sunk into the plaster floors in some rooms were large earthenware jugs that at one time must have been filled with grain or like provisions.... Several of the rooms, even if of no great size, were fur-

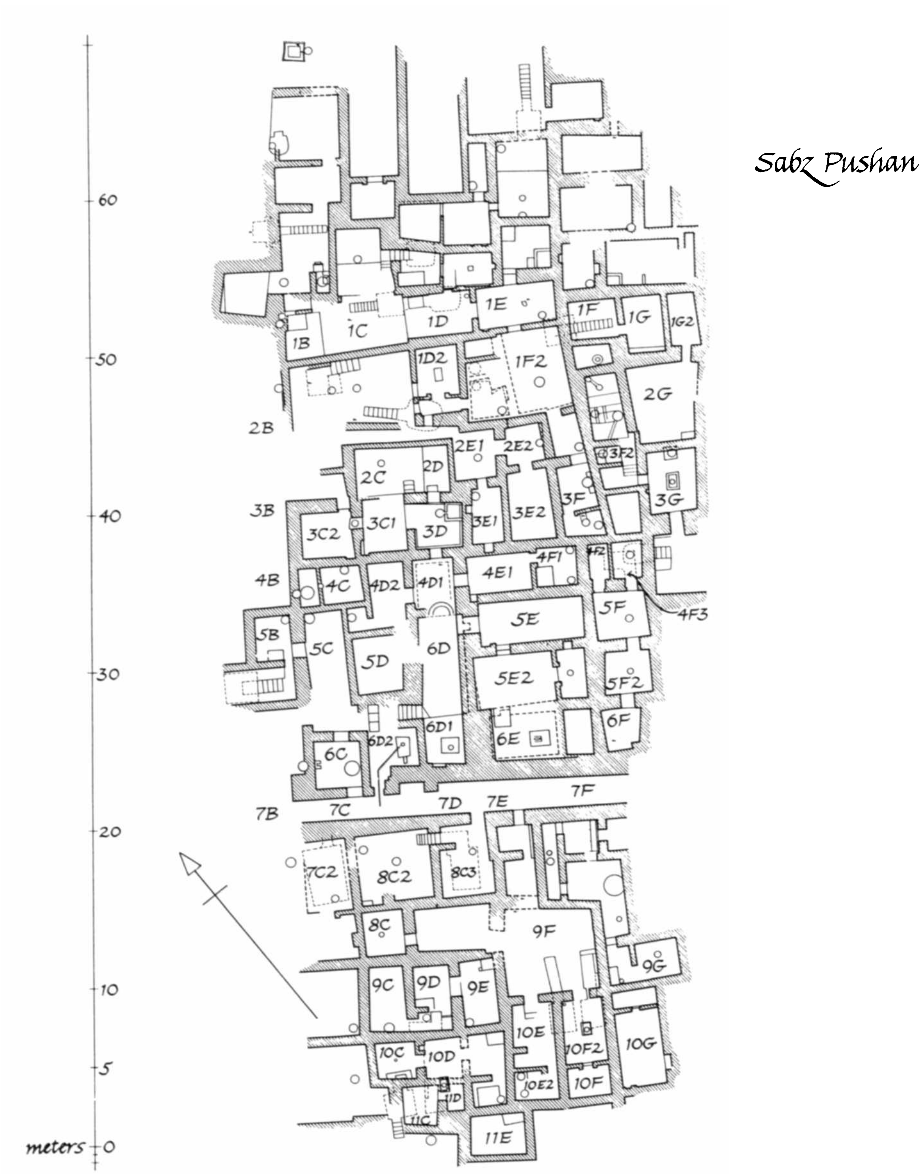


Figure 4. Site plan of Sabz Pushan

nished with a mihrab (which at Sabz Pushan was always built near a corner), appropriately oriented to face Mecca" (ibid., pp. 223–26).

"Each house had one or more vaulted underground rooms well built of baked brick. Some of the smaller ones may have been storerooms, but there are several large ones which doubtless were the forerunners of a common element of the Iranian house—a large underground room generally used as a dining room and place for siesta during the long hot days of summer.... All our houses were supplied throughout the whole of their existence with wells for fresh water, with latrines and cesspools, and with drains for the open courts. In the Samanid period, at least, there were small square rooms for bathing, usually with rectangular basins.... This was all drained into a system of pipes through small holes in the floor" (Wilkinson, "Īrānian Expedition," pp. 8, 9).

Many changes had been made in the rooms at Sabz Pushan, for reasons that are not entirely known. Some of the rebuilding, however, was clearly repair work done after damage from local disasters. A number of coins were found, most of them dating from the eighth to the tenth century. Many fine glazed ceramics were unearthed as well, and some of the rooms contained the remains of wall paintings and carved plaster dadoes. Apparently some of the inhabitants of Sabz Pushan lived in comfort or even affluence (Wilkinson, *Nishapur:... Buildings*, pp. 221, 226).

In all, forty-four glass finds were made during the excavations at Sabz Pushan. This does not seem a particularly large quantity for an urban area where a number of the residents could afford a comfortable style of living. Some of the finds are likely to have been discarded while the site was still inhabited.

It is especially noteworthy that at this site the glass was mainly found in four wells, in rooms B (7 finds), 6F (1 find), 9D (10 finds), and 10E (2 finds); and in six underground rooms (*zir-i-zamins*): beneath 1C (1 find), 1D (4 finds), 1F 2 (1 find), 3X (7 finds), and 6D (1 find), and in a *zir-i-zamin* at the north end of the site (1 find). Only four of these findspots had more than two finds. The size of the *zir-i-zamins* was not relevant, as the large underground room in 6D yielded just a single find (see Wilkinson, *Nishapur:... Buildings*, p. 227, fig. 3.15). In this excavation, unlike that at Tepe Madraseh, no indications of levels were given by the excavators.

The glass finds show that glass was mainly used for utilitarian purposes at Sabz Pushan. Although there are a few finds of high-quality glass (Nos. 207–210), the situation is markedly different from that at Tepe Madraseh, where numerous more sophisticated glass objects were unearthed.

QANĀT TEPE In 1938 excavations began at Qanāt Tepe, a narrow mound punctured by wells and openings into underground aqueducts, located north of Bazaar Tepe and just southwest of Tepe Alp Arslan (Fig. 5). Difficulties were many. The extent of allowable excavation was limited by fields of cotton and other crops surrounding the mound and a public path running through it. Although a strip sixty-five meters long was cleared, in most places only its topmost levels could be excavated before the onset of the approaching war.

At the north end of the mound a mosque was discovered, and at the south end a bathhouse with elaborate murals was excavated. Most of the pottery found was glazed earthenware (Wilkinson, *Nishapur: Pottery*, p. xxxiii). The coins are mainly of the eighth or eighth to ninth century. "Most of the buildings we uncovered in the area open to excavation were like those at Sabz Pushan, modest dwellings poorly constructed. ... Some of the small rooms had sunken fireplaces, many had wells," wrote Wilkinson. "The site at the Qanat Tepe, certainly not a palace, showed that people of lower rank than rulers in Nishapur lived in an elegant and interesting fashion" (Wilkinson, *Nishapur:... Buildings*, pp. 261, 290).

While the dwellings are from the principal period of occupation, kilns (factories housing firing furnaces and equipment) seemed to have been installed at a later date, when the neighborhood became an industrial area. Kilns at the northern edge produced sphero-conical vessels of unglazed earthenware. In the south, kiln debris was excavated, including "lumps of transparent glass or glaze [see appendix 1], spurs, and

...wasters of gritty-bodied alkaline-glazed ware, some of these of fine quality" (Wilkinson, *Nishapur: Pottery*, p. xxxii). The presence of alkaline-glazed ware very likely indicates that the kilns were in use until the end of the twelfth century (Wilkinson, *Nishapur:...Buildings*, p. 263).

Qanāt Tepe is not an important site for glass finds. Only twenty-one glass vessels or fragments were excavated, none of them from either the mosque or the bath. Thirteen finds were unspecified as to location, probably because of the difficult conditions at the site. Among the eight finds with a findspot four came from a well, a pattern similar to that at Sabz Pushan.

Qanāt Tepe

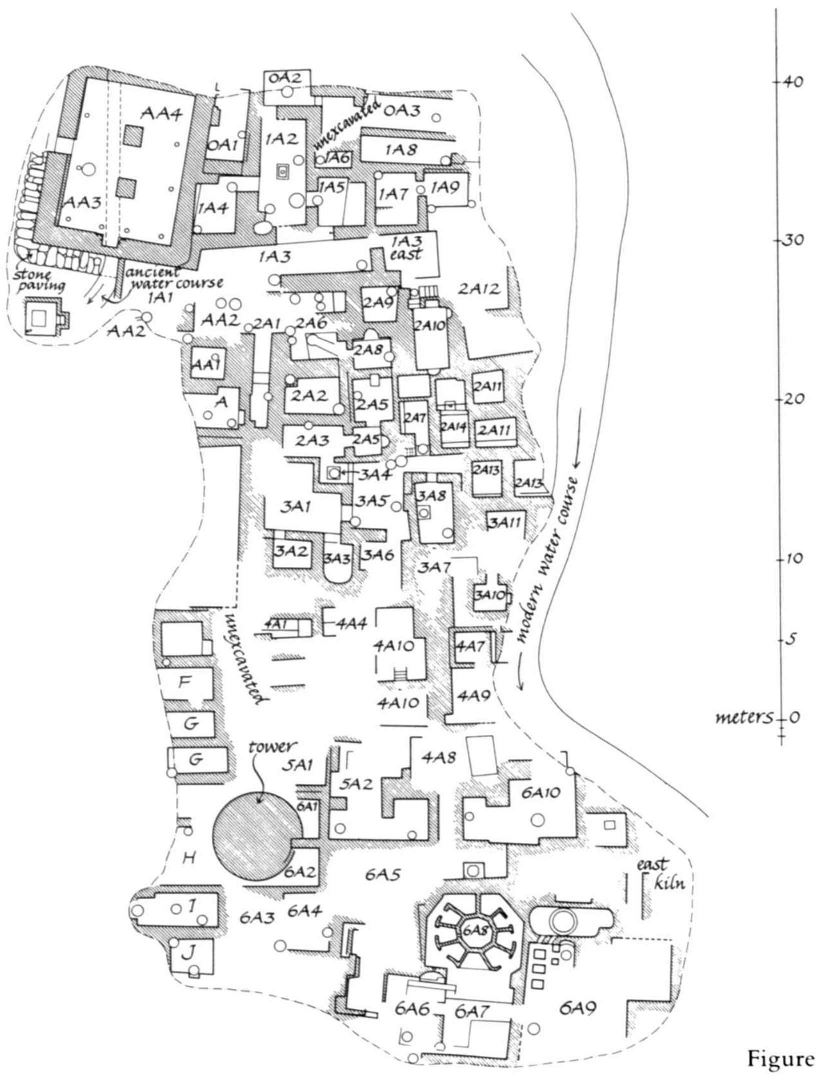


Figure 5. Site plan of Qanāt Tepe

VILLAGE TEPE "Named by the expedition for its proximity to a small village on the old road to the tomb of Muḥammad Mahruq, this small, elongated mound... was composed of the remains of houses of no great size. Like those of Sabz Pushan, they had undergone many changes in the form of little additions and small alterations. In addition, the site was riddled with wells, pits, and sinkaways, making any clear-cut stratification difficult. The occupation of the site had continued in the Seljuq period. This time span is made clear by the pottery found, which closely resembles that of Sabz Pushan. However, a considerable quantity of alkaline-glazed ware was found in the upper level, indicating that the site, unlike Sabz Pushan, was fully occupied until the Mongol invasion. It probably survived to a limited extent after that event" (Wilkinson, *Nishapur: Pottery*, pp. xxxiii–xxxiv). No plan of this mound was published.

Very likely because of the condition of this site just described, only twelve glass finds were recorded. Among them, only the single tapering bottle Number 107 has a findspot. While most of the finds are simple vessels, several represent types not found at other places (Nos. 106, 107, 234, 236). Especially noteworthy is a goblet with applied decoration (No. 151). Wheel-cut glass was not found at this tepe. The finds thus differ in several ways from those at Sabz Pushan and Tepe Madraseh.

THE VINEYARD TEPE The excavation of this tepe four hundred meters to the west of Tepe Madraseh (see Fig. 6) uncovered "a complex of buildings not unlike the palatial structures at Tepe Madraseh and much grander than anything we found at Sabz Pushan. These buildings... had obviously housed someone of importance in Nishapur" (Wilkinson, *Nishapur: ... Buildings*, p. 187). Wilkinson believed that the buildings were contemporary with those at Sabz Pushan and many of the ones at Tepe Madraseh, and that they had been destroyed in the earthquake of 1145 and never rebuilt. To support his hypothesis he cited the eighth-to-tenth-century dates of the coins found there and the absence of alkaline-glazed pottery, which was produced in the second half of the twelfth century (ibid., pp. 188–89). He suggested, on the basis of wall decorations, that the structure belonged to a person of high rank such as a governor and that an important phase of its occupation occurred in the ninth or tenth century (p. 218). The buildings were almost certainly destroyed by an earthquake as well as by subsequent plowings and lootings. Only one glass-related object was excavated, a square plaster lantern which originally had glass panels inset (No. 238). The panels were missing and may have been taken for reuse. Nothing comparable to this fine object was found at the other sites.

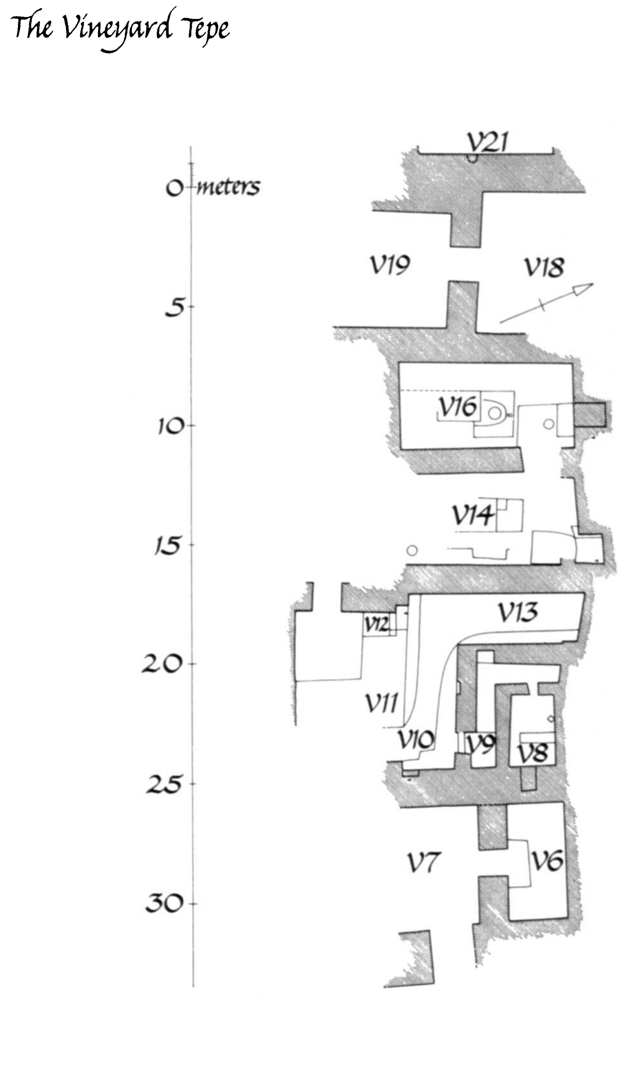


Figure 6. Site plan of Vineyard Tepe

TEPE ALP ARSLAN Tepe Alp Arslan, a high, artificially made mound, is thought to have formed the platform on which the Nishapur citadel was erected. A number of preliminary probings were carried out and suggest that the site was occupied in the ninth to the tenth century (Wilkinson, "Life in Early Nishapur," 1950, p. 68; idem, *Nishapur: Pottery*, p. xxxvii). Only one object was found, a fragment of a pinched vessel, possibly a beaker (No. 137).

THE MOUND NEAR MASHHAD ROAD

a) Falakī site: According to their labels, two glass finds are from an investigation at a mound that has not been given a name. The finds were inventoried in 1939.

A short clearance near the Mashhad Road was undertaken in 1936 on the request of the governor of Nishapur (Wilkinson, "Īrānian Expedition," pp. 21–22). This site, called Falakī, was the northwestern tip of an extensive mound. "The pottery indicated that the site was occupied longer than Sabz Pushan and that it flourished at least until the Mongol invasion and perhaps to some extent even later. The coins found here, though few in number, appear to confirm this" (Wilkinson, *Nishapur: Pottery*, p. xxxiv). Perhaps this site is identical to the mound that yielded the glass finds.

The two glass finds lack specified findspots. One object is a footed beaker with applied decoration (No. 152), a type that has not been found at the other sites. The second is an alembic (No. 241).

b) South Horn site: Southeast of Falakī at one tip of a crescent-shaped mound is the site of South Horn, which yielded interesting results even though major digging was not conducted there. "Near the top were found signs of late twelfth- or early thirteenth-century occupancy.... At the edge of the site were the obvious remains of a pottery shop that specialized in the manufacture of molded ware. The late occupancy of South Horn was supported by the coins found.... These findings at South Horn presented a striking contrast to those at Sabz Pushan, less than a mile away" (Wilkinson, *Nishapur: Pottery*, p. xxxv). The same cannot be said for the glass finds, as the only glass from these investigations seems to be a game piece with insets of millefiori glass (No. 162).

PIECES OF UNKNOWN EXACT PROVENANCE When cataloguing the Nishapur pottery, Wilkinson included pieces "that were brought to the expedition by the workmen and other local peasants" and that could "without doubt be ascribed to Nishapur" (Wilkinson, *Nishapur: Pottery*, p. xl). About eighty glass objects in this catalogue lack exact provenance. They include the finds given that designation by the excavators and also the pieces described by them as "miscellaneous."

PURCHASES The only purchases are five small glass bottles (Nos. 100, 104, 115, 187, 188), two of them molar flasks. As their addition does not distort the general picture, I have catalogued them along with the excavated material. Although no documentation has been found, it is reasonable to surmise that these bottles were purchased from local workmen during the excavations.

Findspots

As has been seen, the overwhelming majority of glass objects from Nishapur were found in wells, drains, *zir-i-zamins*, and occasionally latrines. These places did double duty as trash holes, and it may well be that the glass was dropped or thrown into them as soon as it was broken. Only in the case of the well in room Y6 at Tepe Madraseh is there a possibility that the spot was used as a hoarding place, since many of the twenty-one plates and bowls were found intact. Perhaps this room was connected with the preparation and consumption of food. Wilkinson wrote that in addition to a crude stove consisting of two low brick walls, a kitchen usually contained a well and drain ("Heating and Cooking," p. 286). He also provided information on *zir-i-zamins*, wells, drains, and latrines: "It would seem that the main way of getting water was from subterranean chambers, through which the underground watercourse passed. The finest one

was a domed octagonal structure [near the mosque in Tepe Madraseh]. . . . The water emerged from the tunnel and flowed into and from a tank into which women could dip their pitchers and men their goat skins. . . . There were also innumerable wells, often in very close proximity to latrine pits. . . . The wells were often, but not always, in open courts on which rooms of the house opened.

"The floor [in the houses] also was covered with white plaster and, in order to keep it clean, there was often, in the more luxurious houses, a general raising of the floor except for a rectangular space adjoining the actual doorway. This area was sometimes provided with a small drain hole" (Wilkinson, "Life in Early Nishapur," 1950, p. 73).

The situation is thus very similar to that at Rayy, where most finds also come from wells, sewers, and trash holes (E. F. Schmidt, "Persian Expedition," p. 48), and indeed to that at most Islamic sites.

GLASS-MAKING IN NISHAPUR

Many kilns for the production of pottery were found at Nishapur, but kilns for glass-making were not. Except for the two glass slabs found at the northern edge of the Qanāt Tepe mound (see appendix 1), no remains of glass furnaces, cullet, slag, or wasters (objects with manufacturing defects) came to light. As Wilkinson pointed out, the two slabs were found with wasters of glazed earthenware, spurs (supports for firing), and other kiln debris, and therefore may have figured in the production of glazed pottery—probably alkaline-glazed ware, which is of later date than most glass finds (Wilkinson, *Nishapur: Pottery*, p. xxxii; idem, *Nishapur: . . . Buildings*, p. 262).

Thus, although it can be taken for granted that glass was produced in Nishapur, the excavations have not yielded definitive evidence of that production. Consequently it is impossible to determine, for instance, if glass was produced near pottery kilns, or whether glass kilns were situated within the city—as they were in Sīrjān—or outside the city walls. It is probably a matter of chance that the excavators have not found any glasshouses. Since in Sīrjān as many as seventeen glass furnaces have been discovered, it is reasonable to assume that there was more than one glasshouse in Nishapur. Although we now have a better idea of the products of the glass industry in this part of Iran during the ninth and tenth centuries, it must be admitted that we still know very little of the glass-making centers.

Something can be deduced from the finds themselves. The homogeneities of the glass fabrics, the vessel shapes, the similarities in design and style of wheel-cut vessels such as Numbers 222 and 223, and the styles of calligraphy on the inscribed glass hint that the objects were all manufactured in one region. An object with imperfect wheel-cut decoration, such as the beaker Number 217, surely cannot have traveled a long way to reach a customer. If this vessel can be regarded as a waster, it would constitute proof that glasshouses existed in Nishapur. The absence of finds certainly recognizable as imports may be taken as further evidence that glass was manufactured at Nishapur.

It is possible, then, essentially to agree with a main conclusion of the excavators in 1942: "One of the most important results of the two seasons' [1938–40] digs are the finds of glass vessels decorated by various methods. . . . The quality of the glass [vessels] indicates further that here and perhaps elsewhere in the province of Khurasan there was a highly developed glass industry in the ninth and tenth centuries" (Hauser and Wilkinson, "Museum's Excavations," p. 82).

Although we have no information about how the Nishapur glasshouses worked, glass must have been manufactured there in much the same way as in other regions. The batch, or mixture of raw materials, would have been melted in the furnaces, which would have been fired perhaps with wood or coal. It can be assumed that cullet, or glass refuse, was among the materials melted, a recycling practice that was economical and seems to have been usual. After the glass had melted, the process of working the viscous material, or metal, would begin. Since its invention in Syria at the end of the first century B.C., the blowpipe had been the most important tool used in the manufacture of glass. It may have been a

hollow metal tube, as it is nowadays, which the glassmaker dipped into the molten glass. By twisting the blowpipe he would collect a gob, or "gather," of glass from the furnace; then he would blow through the pipe to inflate the glass bubble, or parison. During the process of manufacturing a free-blown vessel, the glass gather would be rolled on a flat surface called the marver to smooth and consolidate it. Then the gather would be inflated with the blowpipe. When the vessel had reached its approximate or final desired form, a reamer would have been used to push up a concavity, called a kick, in the base of the vessel. Before the vessel was removed from the blowpipe, a metal rod, the pontil rod, would be tipped with molten glass and applied to the base of the vessel so the vessel could be held and manipulated during the completion of other details, such as the neck or the rim. When the pontil rod is removed it leaves a scar or ring mark, which is called the pontil mark. Many vessels carry the marks of a modeling tool that was used for splaying the rim or fashioning other details. In addition to making free-blown glass as just described, the Nishapur glasshouses produced vessels in all the other techniques typical for the early Islamic period.

Glass colors

In identifying the colors of glass, I have followed the approach described by Donald B. Harden: "The actual naming of colours must always be guided by subjective criteria.... It cannot therefore be hoped that the colour nomenclature adopted... will prove an absolute guide to the reader, but it may be hoped that it will guide him relatively. Various colour groups are first distinguished, the principal being green, yellow and blue. A graded scale of terminology has been employed within each colour group... proceeding from light to dark.... In describing mixed colours the predominant colour is always mentioned last. That is, yellowish green means green with a yellow tint, while greenish yellow means yellow with a green tint.... Glass which shows no trace of coloration except at an edge or fracture is called colourless, and if the tinting visible at the edge or fracture is at all noticeable it is described as colourless with greenish tinge, colourless with yellowish tinge, and so forth" (Harden, *Roman Glass*, pp. 7–8).

Colorless glass seems to have been the most popular type of glass at Nishapur. Nearly half the glass finds are colorless, and most of the others are colorless with a greenish or yellowish green tinge. Colorless glass tinged slightly greenish was produced more often than green glass. Dark yellowish green (emerald) is rare. Light blue, blue, and dark blue examples are limited in number. Black glass is found only in beads. Manganese (purple) glass and dark brown glass do not occur. (For chemical analyses of the glass, see appendix 3.)

There can be no doubt that a hierarchy of glass colors existed. Robert H. Brill demonstrates in detail in appendix 3 that "the colorless glasses were clearly something special, and special efforts had been taken to make them as nearly free of color as possible."

Vessels for domestic, everyday use were usually green-tinged. But some are of colorless glass, and with these examples, other characteristics as well point to their having been manufactured with particular care. Because the objects have weathered, however, it is not possible to determine whether there are differences in the quality of the colorless glass. Higher-quality glass was usually colorless; wheel-cut vessels provide examples.

The use of colorless glass tinged green, or sometimes yellowish green, seems to go back to a color tradition found predominantly in Sasanian glass (Kröger, *Parthisches... Glasfunde von Ktesiphon*, "Glasfarben"). The fashion for colorless glass may have been the result of influence from Samarra, where high-quality glass generally was colorless.

Excavations at places such as Shah Tepe and Takht-i Sulaimān show that colorless glass was less common at these sites than it was at Nishapur. This is probably an indication that colorless glass was produced only at higher levels of glass-making.

Vessels decorated with applied glass are most often colorless. The actual applied threads may be colorless, blue or dark blue, or greenish. The

same color schemes characterize applied and cameo glasses from Samarra; see Lamm, *Glas von Samarra*, no. 187, pl. 5; nos. 268, 270, pl. 7 (dark green); no. 249, pl. 8 (blue).

Dark blue and dark yellowish green (emerald), rare colors that are relatively uncommon in Nishapur glassware, were used mainly for high-quality glass. Dark blue is known in a number of examples and seems to have been much the preferred color for incised glass (No. 164). Emerald, known here only in the small bottles Numbers 186 and 187, was used outside Nishapur for a variety of vessels of high-quality glass and was apparently more widespread than has hitherto been recognized. An example is the bowl in San Marco (K. Erdmann, "Opere Islamiche," no. 118). An unpublished fragment of an emerald wheel-cut bowl close to the San Marco bowl, said to be from Nishapur, is now in Berlin in the Museum für Islamische Kunst (I.1991.10). For other examples see Saldern, "Sassanidische... Gläser," fig. 13 (large wheel-cut bottle); Folsach, *Islamic Art*, nos. 219, 220 (cameo bottles); Goldstein et al., *Cameo Glass*, fig. 13 (Corning ewer), nos. 20, 21.

The question whether certain glass colors were preferred because they were also the colors of materials more valuable than glass cannot be answered here. Colorless glass can approach the appearance of rock crystal, dark blue glass may have been associated with or been thought of as an imitation of lapis lazuli, and dark green glass may also have imitated a more precious stone. However, except among jewelry, no finds of opaque glass were made; the glass is always translucent.

Weathering

Most glass from Nishapur shows some kind of corrosion or weathering. The glass may be pitted, or it may have a very smooth crust produced by chemical reactions, usually relatively thin but at times of considerable depth. There was no find on which the corrosion had eaten through the entire glass so that it crumbled away, as has sometimes been the case with Sasanian glass (see Kröger, *Parthisches... Glasfunde von Ktesiphon*, "Zersetzungserscheinungen"). Colorless glass, the single largest category of glass in Nishapur, sometimes shows insignificant weathering and sometimes carries a thin weathered layer of a color anywhere between grayish white and black. Other examples have a beautiful iridescent enamel-like layer, which flakes off easily, with multicoloring underneath. Dark blue and dark green glass finds usually have iridescent weathering, beneath which the surface of the glass may be rough and corroded.

It should be stressed that glass vessels of the same color can have very different weathered appearances, depending on the composition of the glass and the circumstances of burial.

The pontil mark

One peculiarity of the glass-making process is the characteristic production of a pontil mark.

"In hand glass blowing... it is necessary to transfer the article being blown from the blowpipe to some sort of holding device. In this way, the workman can perform those operations needed at that part of the glass which was first attached to the blowpipe.... The glass-tipped end [of the solid iron pontil bar] was... applied to the bottom of the glass piece still on the blowpipe... to transfer the piece to a temporary holding device for further manipulation.... The detachment of the piece from the pontil often left a scar of broken glass, either from the glass tip on the pontil, or from the bottom of the piece itself, or both" (Toulouse, "Empontiling," p. 137).

As the finds show, use of this method was widespread in Nishapur. Pontil marks are common and sometimes retain a broken-off bit of glass. A number of bowls, however, display a very crude pontil mark with a good-sized dab of glass transferred from the glass tip on the pontil. In these cases the pontil mark may be left projecting to such a height that the vessel cannot stand properly (Nos. 6, 15, 16, 35, 36). It is difficult to understand this carelessness, since vessels of identical shape can be worked without a crude pontil mark. (Bottles are usually made with the base kicked up, so in their case the crudeness of the pontil mark does no harm [Nos. 91, 92].) It

must be mentioned that crude pontil marks have a tradition, being known from Parthian, Sasanian, and Islamic glass finds (Kröger, *Parthisches ... Glasfunde von Ktesiphon*).

The pontil mark naturally varies according to the size of the vessel. Its diameter on smaller vessels is usually about 1.2 centimeters (No. 101) and on larger vessels is usually about 2.2–2.5 centimeters.

A second type of pontil mark is the scar left by the blowpipe when it is used as a pontil. This mark is a circular ring; the glass inside the ring is apparently untouched (Toulouse, "Empontiling," p. 139). The type is rare in Nishapur and is only to be seen on the bowl Number 15, where what remains of the glass tip on the pontil has a diameter of 2.2 centimeters, the diameter of the pontil rod was 1.4 centimeters, and the metal wall of the rod was 0.3 centimeters thick. Though never common in the Ctesiphon region, glass showing this type of pontil mark is somewhat more frequently seen from the late Sasanian and early Islamic periods (Kröger, *Parthisches ... Glasfunde von Ktesiphon*).

It was usually low-cost domestic glass on which the pontil mark was allowed to remain. On most wheel-cut glasses the pontil mark was completely ground off and the bottom of the vessel decorated (see below, pp. 121–22).

While the vessel was on the pontil it could be fashioned in any of a variety of ways. Sometimes the surface indicates that it was worked on a sandy ground (Nos. 15, 26). Many vessels show a number of marks which reveal that they were tooled with instruments to attain the desired shape (Nos. 26, 27, 106). Tooling was customary with free-blown and mold-blown vessels.

STRATIGRAPHY AND QUESTIONS OF DATING

The excavations at Nishapur did not produce a stratigraphy that could yield chronological groupings of the finds from different levels. Nevertheless, they provided evidence that can aid in establishing a relative chronology of the glass finds, many of which are from wells and drains that supply specific contexts. Evaluating the relationships between objects from different findspots at a single site and comparing objects found at different sites enable us to form a clearer picture of the nature of the various findspots and sites and thus to acquire a sense of which types of glass might have been contemporary with one another.

Correlating the glass with finds of different materials is, however, difficult or impossible, primarily because Wilkinson did not provide the exact findspots of the pottery finds. In his book, the pottery is arranged according to groups whose sequence "is not intended to imply a development in time, for generally speaking, with the exception of the late alkaline-glazed ware, the production of certain types of all these wares, in Nishapur and elsewhere, coexisted, at least in the tenth century" (*Nishapur: Pottery*, p. xl), and "Precision of dating is simply not possible in this pottery" (p. xli). Nevertheless, Wilkinson frequently notes that a given object was found at a certain level that suggests a specific date (e.g., p. 11, nos. 23, 25; p. 16, no. 50; p. 17, no. 56; p. 106, no. 65). From such statements a pattern emerges for Tepe Madraseh—the largest and most important site and the one that yielded an overwhelming majority of the pottery finds—suggesting a ninth-century date for the low or lowest levels and a tenth-century date, probably reaching into the early eleventh century, for those levels close to the top.

For the metalwork, a clear sense of the dates is also difficult to obtain. Allan's conclusions on stratigraphy and dating are as follows: "The excavations were unstratified, and the dating of objects through their stratigraphic relationship with other objects is therefore impossible. This means that an object may be dated in two ways only: by the approximate dating given to the primary and terminal occupations of a particular tepe through a general study of the finds and by the form and decoration of the particular object concerned." Allan further concluded "that in reality the excavations provide virtually no dating evidence for the finds and that dates must therefore be deduced from stylistic considerations" (Allan, *Nishapur: Metalwork of ... Islamic Period*, p. 13). He nevertheless provided exact findspots

and levels for the metal objects, making it possible to correlate glass and metalwork.

It should be frankly stated at the outset that a complete description of the occurrence of glass in Nishapur does not seem possible. For one thing, some uncertainty exists about the actual number of finds. In their report on the excavations of 1939 and 1940 the excavators wrote, "The ruins of Nishapur are strewn with myriad fragments of glass" (Hauser and Wilkinson, "Museum's Excavations," p. 105). The actual number of recorded finds, 243 vessels or vessel fragments without the jewelry, seems minute for such an extensive excavation; the number of sherds especially is distressingly small. Only from notes on the original drawings, which indicate that additional fragments of a given type had also been found, was I able to deduce that some fragments had been discarded without being recorded in any detail. It is possible that some finds were not recorded because they belonged to types of which the excavators had already collected more complete or better-preserved examples. In at least some cases, the fragments were fairly carefully recorded before being discarded; this occurs, for example, with the similarly shaped bottles Numbers 93–95, found at different sites. Number 93 was collected, Numbers 94 and 95 discarded (see p. 74). From the artistic point of view this whole question is perhaps not particularly important, but for statistical purposes it certainly is relevant. More thorough documentation might have afforded us a better idea of which vessel types were used in greater numbers.

There are other questions besides the issue of the actual number of finds. Thirty-four of the Nishapur finds are without a stated provenance, and of those whose provenance is known, not all have an exact findspot. Thus, of the finds from Village Tepe only one has a findspot, while eleven are unspecified; from Qanāt Tepe, of the twenty-one finds eight have a findspot and thirteen are unspecified. Because of the fragility of glass, the finds represent only a part of the body of wares that were actually in use in the city.

Despite these limitations on our knowledge, it seems possible to assign dates to the finds on the basis of internal and external evidence and to come to some conclusions about a general date for many of the types.

To give a sense of which glass types were found together, the section that follows lists the objects from rooms that yielded a sizable number of vessels and identifies the levels at which they were found.

Tepe Madraseh

The most numerous and most important glass finds were made at the carefully excavated site of Tepe Madraseh and are worth discussing in detail.

Room H4

Total finds: Nos. 141, 167, 202, 203, 217, 218, 220, 227, 228
Without precise findspot: No. 167
In well, lower level, deep: No. 227
In drain, lower level: Nos. 141, 202, 203, 217, 218, 220, 228

Except for the ewer Number 141, which has a stamped or pinched decoration, all these vessels are decorated by means of wheel-cut techniques. The beaker Number 167 is faceted, and the other vessels are in the intermediate and slant-cut styles. Thus these objects provide a good representation of some of the wheel-cut glass styles popular at Nishapur. The excavators proposed a date of about the beginning of the tenth century for the finds from the H4 drain.

The finds in this room are atypical. A group of high-quality vessels such as these was probably a collection that had been carefully assembled and preserved and that therefore might contain one or two objects dating to the late ninth century.

Pottery: A buffware bowl from the well in this room has been dated to the late ninth century (Wilkinson, *Nishapur: Pottery*, pp. 10, 34, no. 20 a-b, colorpl. 1). Also found were another bowl (pp. 28, 53, no. 88a), and yet another from the drain (pp. 185, 196, no. 11).

Metalwork: No finds recorded.

Room S4
Total finds: Nos. 82, 166, 177, 184, 185, 194, 195, 196
In S4 well: Nos. 166, 185, 194, 195, 196
In S4 well by "maze": Nos. 82, 177, 184

S4 is the large *aivān* (open hall) in the northeastern part. Although the finds are not numerous, they comprise the important relief-cut vessel fragments Numbers 194–196. Number 194 seems to be of a quality superior to all the other relief-cut finds. These three are the only fragments with plant ornament in the relief-cut style and may be dated to the ninth century. The other finds from room S4, which include the important small bowl Number 184, would be compatible with a ninth-century date.

Pottery: There are no pottery finds from the two wells, but there are some from different findspots in S4. One glazed bowl from this room belongs to the buffware group (Wilkinson, *Nishapur: Pottery*, pp. 13, 37, no. 36). A second piece could not be given a Nishapur origin with certainty (pp. 187, 198, no. 25). A glazed bowl was found in the S4 annex (pp. 97, 114, no. 16, black-on-white–ware group).

Metalwork: There are no finds from these wells, although there are some from other findspots (Allan, *Nishapur: Metalwork of... Islamic Period*, nos. 30, 35 [S4 second level], nos. 184, 209 [drain in S4 annex]).

Room S8
Total finds: Nos. 70, 97, 131, 222, 223
In *zir-i-zamin*: No. 70
In well, *zir-i-zamin*: No. 97
In well: Nos. 131, 222, 223

The different terms used by the excavators for the findspots in this room are difficult to interpret. It seems that the designations "*zir-i-zamin*" and "well, *zir-i-zamin*" were used for two different findspots. It is notable that the two vessels associated with the *zir-i-zamin* are plain bottles, while the other finds are decorated glasses. The plain bottles are of types probably used over a considerable period of time, while the decorated vessels would fit into a tenth-century time frame.

Pottery: Three buffware bowls (Wilkinson, *Nishapur: Pottery*, pp. 8, 31, nos. 3–5) and three unglazed pitchers (MMA 40.170.49, MMA 40.170.191, and one example in the Iran Bastan Museum in Tehran, expedition no. 39 N 319) are from this room. Two glazed bowls were found in a well. One, in Tehran (expedition no. 39 N 190, color-splashed ware), has not been assigned to a specific level, while a second bowl from a deep level in the well was described as a luster piece of the ninth century from Iraq by Wilkinson (*Nishapur: Pottery*, pp. 188, 199, no. 33).

Metalwork: A lamp was found in a low-level drain in this room (Allan, *Nishapur: Metalwork of ... Islamic Period*, no. 108, dated A.D. 800–1000). No glass finds are reported from the drain.

Room T0
Total finds: Nos. 37, 38, 46, 58, 101, 112, 113, 198, 242
In room: No. 242
In latrine: No. 46
In well, deep level: Nos. 37, 38, 101
In drain, deep level: Nos. 58, 112, 113, 198

According to their excavation labels, the finds in this room are from various spots within the room. Except for the two finds without designated levels, all the finds are from a deep level. Because the two cylindrical beakers with an interior ring were found in a deep level and because this type is well attested for the ninth century, it is likely that a ninth-century date can be assumed for them and thus for the other finds at this level as well.

Pottery: There were seven finds from this room, and only for a bowl of opaque yellow ware was no level noted (Wilkinson, *Nishapur: Pottery*, pp. 206, 210, no. 1). Opaque yellow ware was produced and employed in Nishapur during the ninth and tenth centuries, but after that it does not seem to have been made, according to

Wilkinson (p. 205). A buffware bowl (pp. 14, 39, no. 40) came from a low level, and two other bowls of this type (pp. 8, 32, no. 7; pp. 11, 36, no. 25) and an unglazed cooking pot (pp. 318, 350, no. 88) were found in a deep-level drain. Two other vessels, an unglazed jar (pp. 297, 337, no. 9) and a bowl of opaque whiteware (pp. 183, 194, no. 1), probably an import from Iraq, were excavated under a pier in this deep-level drain. As the opaque white bowl number 1 is said to have been found with the buffware bowl number 7, their findspots would seem to be identical. According to Wilkinson, the deep level was the lowest level of a ninth-century building. The ninth-century date assumed for the pottery thus corroborates the ninth-century date assumed for the glass finds.

Metalwork: No finds recorded.

Room W0
Total finds: Nos. 48, 52, 181, 192
In well: No. 48
In well, deep level: Nos. 52, 181, 192

The finds from this well are a mixture of undecorated and decorated glass. The cylindrical beakers Numbers 48 and 52 are of a type common in the ninth century that probably became gradually less fashionable during the tenth century. The beaker Number 52 is the most perfect example of its type. There are two relief-cut finds, of which beaker Number 192 is one of the outstanding works found during the excavations. Because of its level it was dated to the second half of the ninth century, a date confirmed by stylistic parallels.

Pottery: Eight glazed and unglazed pottery vessels come from this room. One, a pitcher (Wilkinson, *Nishapur: Pottery*, pp. 303, 340, no. 33), is without a stated level. The other finds are from low levels of wells and drains and have been given a ninth-century date by Wilkinson (pp. 240, 251, no. 50; pp. 295, 336, no. 2; pp. 314, 349, no. 76; pp. 320, 350, no. 93). An exception is a bowl which has not been dated (pp. 13, 37, no. 35).

Metalwork: The deep level in this room yielded five ewers, which were dated to the ninth century by Wilkinson (*Nishapur: Pottery*, p. 302) but were given a ninth-to-tenth-century date by Allan (*Nishapur: Metalwork of... Islamic Period*, pp. 41–42, nos. 93, 94, 96, 97, 99).

Room W4
Total finds: Nos. 32, 164
W4, well in annex: No. 32
W4, well in annex, low level, below gatch (plaster floor): No. 164

Although the two glass finds are from one well, we have a statement of level for only one of them. The fragment of an incised plate (No. 164), which was found in the low level of the well, was called one of the earliest pieces and dated to the first half of the ninth century in the 1942 report (Hauser and Wilkinson, "Museum's Excavations," p. 105). This dating is still valid and has been confirmed by incised plates of very similar types found in China and datable to before 874. As the footed bowl Number 32 has no stated level it cannot be dated with certainty, but parallel finds in other materials allow it to be assigned to the ninth to tenth century.

Pottery: The two pottery finds from this room probably do not come from the same level. A glazed bowl without stated level was cautiously given a ninth-century date (Wilkinson, *Nishapur: Pottery*, pp. 185, 196, no. 10), while a bowl from the topmost level was assigned to the tenth century (pp. 134, 148, no. 9).

Metalwork: An important amulet case found in this well, its level not identified, was dated to between 950 and 1050 by Allan (*Nishapur: Metalwork of... Islamic Period*, p. 27, no. 1).

Rooms X4–Y
"The small group of rooms from X4 to Y were decorated with carved plaster, and from them we retrieved pottery of excellent quality, Y2 being especially prolific" (Wilkinson, *Nishapur:... Buildings*, p. 91).

Room X8
Total finds: Nos. 8, 19, 20, 49, 50, 90, 204–206, 224–226
In well, no level given: Nos. 49, 50, 226
In well in court, second level: Nos. 8, 19, 20, 90, 224, 225
In court, next to top level: Nos. 204–206

The finds from this room consist of undecorated bowls, a bottle, and wheel-cut glass of the slant-cut type. No level is given for the two cylindrical beakers Numbers 49 and 50; they belong to a type that was popular in the ninth century and seems to have continued into the tenth century. The designations used make it obvious that there were two findspots in the court. A note among the Nishapur material, made by Prudence Oliver Harper and based on Charles Wilkinson's oral account, mentions that the second level in the well is a fairly high stratum. We therefore have reason to believe that the finds from this room date from the tenth century.

Pottery: The vessels said to come from this room are all unglazed and represent common types of which only the more important examples have been published. A dish (MMA 40.170.54) is without designated level. A one-handled jug in Tehran (expedition no. 39 N 407), a pitcher of a common ninth-century type, and a drinking pitcher also assigned a ninth-century date (Wilkinson, *Nishapur: Pottery*, p. 297, no. 10, pp. 296, 336, no. 7) are from the well in X8; their levels are not named. A flowerpot (pp. 322, 351, no. 99) and a cup (MMA 40.170.41) are from the well in the court, the former from an upper level and datable to the eleventh or twelfth century, according to Wilkinson.

Metalwork: No finds recorded.

Room X14
Total finds: Nos. 92, 93, 193
In room: Nos. 92, 193
In well, lower level: No. 93

The finds from this room show wide contrasts: elongated bottles, simple utilitarian vessels perhaps for storage (Nos. 92, 93), were found next to one of the truly outstanding pieces of relief-cut glass (No. 193). Unfortunately, however, the findspot of only one of the bottles is known. Parallel examples make it likely that all three finds date from the ninth century.

Pottery: Two buffware bowls with related decoration were found in this room. The first was found on a level given simply as low (Wilkinson, *Nishapur: Pottery*, pp. 14, 40, no. 41). The second, described as being from a low level of the well (pp. 14, 41, no. 42), is probably of the same level as the elongated glass bottle Number 93.

Metalwork: A dagger blade was found in this room (Allan, *Nishapur: Metalwork of... Islamic Period*, no. 206).

Room Y2
Total finds: Nos. 183, 229
In well: No. 229
Below first gatch: No. 183

The glass finds from this room were in different locations and have nothing in common, the find from the well being an inkwell and the other find a relief-cut bowl, which certainly was among the more expensive pieces. In quality the glass finds do not match the high level of the finds in other materials from Y2.

Pottery: According to Wilkinson (*Nishapur: Pottery*, p. 91), the pottery from room Y2 was of excellent quality. However, notes stating which pottery vessels were excavated in this room could not be found.

Metalwork: A low level in this room yielded the "Nishapur sword," which has been dated to the ninth century (Allan, *Nishapur: Metalwork of... Islamic Period*, no. 208; idem, "Nishapur Metalwork: Cultural Interaction," p. 5).

Room Y6
Total finds: Nos. 5, 6, 11–18, 24–30, 35, 36, 148, 150

In room (see below): Nos. 13, 24, 25, 27, 30, 148
In well: Nos. 5, 12, 16–18, 36, 150
In well, high level (gatch): Nos. 6, 11, 14, 15, 26, 28, 29, 35

Unfortunately, little is known about the circumstances of the discoveries made in this room. For six vessels no particular findspot was designated. Seven vessels are said to come from a well. Eight vessels were found in a well at a high level just below the floor. The excavators did not indicate whether these references are to two separate wells in the room or all to just one well. If there was only one well, fifteen finds were found in different strata of the same well. Perhaps this room is one of the spots referred to by the excavators when they wrote, "We have been fortunate enough to find several pits containing great quantities of almost complete glass vessels which were thrown in as soon as they were cracked or broken" (Hauser and Wilkinson, "Museum's Excavations," p. 105). (Room S4 may be another one.) A comparison of the vessels described as having been found in a well suggests fairly certainly that they are close contemporaries and thus that they all come from the same well (compare, for example, Nos. 5 and 6, 11 and 12, 35 and 36). The other finds from the room are also very similar, and therefore it seems likely that all the finds from room Y6 belong to the same period. Since none of the finds are related to ninth-century vessels, it is reasonable to conclude that the glass from this room should be given a tenth-century date.

It is interesting that this hoard was full of undecorated bowls and plates but included no cylindrical beakers, bottles, or jars. Not a single decorated glass was among the finds. The well contained vessels of a variety of types that can all be thought of as roughly contemporary, constituting fairly convincing evidence that an active glasshouse existed in the city. As far as I know, this is the most complete set of plain tableware from the Islamic period that has come to light in Iran.

Pottery: The five vessels from this room were found at different levels. A monochrome glazed bowl (Wilkinson, *Nishapur: Pottery*, pp. 235, 246, no. 25) is said to come from a location indicating a tenth-century date. Among two other vessels found in a high level of a well (pp. 68, 86, no. 60), a monochrome glazed jar (pp. 232, 243, no. 3) was described as being probably not earlier than the late tenth century. The more interesting pieces, a platter and a bowl of the polychrome-on-white group, are both "from a well that had been sunk from an upper-level plaster floor in an important building, the location indicating a date not earlier than the last part of the tenth century and perhaps later" (pp. 130–31, 146, nos. 1, 2); both may have been imported from Afrāsiyāb. Thus, the pottery finds from this room point to a tenth-century date, the conclusion also reached for the glass finds. Unfortunately, however, it is not known whether the glass finds came from the same well as the pottery ones. It should be noted that no pottery hoard similar to the glass hoard was found.

Metalwork: No finds recorded.

The significance of the Tepe Madraseh finds

In this treatment of the Tepe Madraseh finds, discussion of the different levels cannot be regarded as a substitute for a stratigraphy by the excavators. Nevertheless, a number of important points are brought out through room-by-room analysis of the finds.

The descriptions of the pottery could not incorporate evaluations of all the pottery finds from each room, because complete find lists have not been located. Still, the fact emerges quite clearly that in form and decoration, hardly any relationship existed between objects of unlike materials. Apparently craftsmen in glass, pottery, and metal worked in different traditions in Nishapur.

It is evident that a number of glass vessel types were produced with little change over a long period of time. They include simple vessels such as various bowl and bottle shapes, alembics, and probably lamps. However, the finds do not per-

mit the reconstruction of a very complete picture: for instance, there is no hoard from a low level equivalent to the finds in the well of Y 6, so it is impossible to know whether use of this sort of glass tableware goes back to earlier periods. Another example is the absence of comparative material for the finds of alembics and lamps from Tepe Madraseh.

It would be possible to form a reasonably good idea about the relationship between the different levels if vessels that are nearly identical—or very different—had been found at both low and high levels. However, not much material lends itself to such a comparison. One may cite the two bottles Numbers 108 and 109, which are similar although not identical in shape; they are both from Tepe Madraseh but from different rooms and different levels. Number 108 is said to come from a low level and Number 109 from a level below the top in a well. The bottle shape is known from ninth-century Mesopotamia and so may have been used in Nishapur from the second half of the ninth century onward. It certainly was very popular in Nishapur throughout the tenth century, as finds of both undecorated and decorated examples demonstrate.

The finds from the different levels also suggest that wheel-cut glass was made in a variety of styles throughout the ninth and tenth centuries. The relief-cut glass examples seem to be mainly from low levels, or else were found in sherds. This would suggest that they were more common in the earlier phases of occupation of the excavated buildings, that is, in the second half of the ninth century. However, this does not necessarily imply that use of relief-cut glass in Nishapur was restricted to the ninth century. It is probable that it was also manufactured in the tenth century, although finds have not come forth. The finds in room H4 suggest that the different types and techniques of wheel-cut glass were contemporaneous. This would argue for the coexistence of the various wheel-cut types during the tenth century, an argument reinforced by the fact that in the ninth century the different methods already seem to have coexisted in Samarra.

Sabz Pushan

Room B, well
Total finds: Nos. 3, 4, 22, 23, 47, 209, 243

The finds from this well consist of small bowls (Nos. 3, 4), larger bowls (Nos. 22, 23), and a cylindrical beaker (No. 47). An alembic (No. 243) was also found. The only decorated vessel is a bottle with a pattern of arches (No. 209). As is the case elsewhere in Sabz Pushan, the objects found here are simple glassware for domestic use. The decorated bottle Number 209 belongs in this category as well.

Room 1 D, *zir-i-zamin*
Total finds: Nos. 59, 121, 125

The few finds from this underground room include a plain jar (No. 59) and two different types of mold-blown bottles (Nos. 121, 125).

Room 3 X, *zir-i-zamin*
Total finds: Nos. 114, 119, 124, 126, 156, 157, 161

Seven vessels were found in this underground room. They consist of mold-blown cylindrical beakers (Nos. 114, 124[?], 126); bottles with either mold-blown (No. 119) or applied (Nos. 156, 157) decoration; and a ewer with applied decoration (No. 161).

Room 9 D, well
Total finds: Nos. 7, 40, 41, 43, 103, 149, 154, 155, 239, 240

This well contained a vertical-walled bowl (No. 7), different types of beakers (Nos. 40, 41, 43), a large plate with applied decoration (No. 149), different kinds of bottles (Nos. 103, 154, 155), and two alembics (Nos. 239, 240).

Sabz Pushan compared with Tepe Madraseh

It is useful to compare the contents of the underground rooms and wells in Sabz Pushan with those of the rooms in Tepe Madraseh. Marked differences are evident: at Sabz Pushan simple utilitarian vessels, either undecorated or mold blown, constitute the major groups of finds. Indeed, the number of mold-blown objects is far greater than at Tepe Madraseh. Although a small number of wheel-cut glasses, especially beakers, were found in Sabz Pushan, this type of vessel does not seem to have been in much use there. None of the finds are of outstanding quality, seemingly a demonstration that this urban settlement was of minor importance compared with the palatial complex of Tepe Madraseh.

The utilitarian vessels used in Sabz Pushan are similar or even identical to those occurring in Tepe Madraseh. Therefore it seems likely that here too, the principal time of habitation was the ninth and tenth centuries. However, none of the finds from Sabz Pushan can be definitively placed in the ninth century, although admittedly much of the simpler material is difficult to date precisely. The presence at Sabz Pushan of a rimmed plate with a thread decoration (No. 149) very similar to the tenth-century one from the well of Y6 at Tepe Madraseh (No. 150; see also No. 15) is evidence of contemporary habitation and strongly supports a tenth-century date for the Sabz Pushan material. Among domestic wares, it is noteworthy that three of the five alembics excavated are from Sabz Pushan.

The Nishapur finds in toto

It is important to note that in a number of instances, vessels of identical type were found at different Nishapur sites. This shows that the sites were in use contemporaneously and that a variety of vessel shapes were widely circulated within the city.

Some of the vessel types were found at just one site but in more than one room. This is so with two different types of mold-blown bottle. Numbers 131 and 132 were both found at Tepe Madraseh, Number 131 in the well in room S8, and Number 132, possibly with a number of similar bottles, in room W1. Numbers 133 and 134 come from the same site, from the rooms T1 and U3. A mold-blown beaker with a simple decoration (No. 126) found in the *zir-i-zamin* belonging to room 3X at Sabz Pushan is the subject of an excavators' note pointing out that the type was found elsewhere as well. The notation is open to different interpretations: does it mean in other rooms at the same site, or at different sites? Mold-blown vessels of another type, probably bottles (Nos. 121, 122), were found at Sabz Pushan in room 1D and in several different spots at Tepe Madraseh (rooms U1, U2, and S9).

For only a few vessel types were examples found at more than two sites. One type is that of small, variously shaped bottles of the simplest manufacture (Nos. 60ff.), which are characteristic for Islamic sites. In Nishapur they were found at Tepe Madraseh, Sabz Pushan, Qanāt Tepe, and Village Tepe.

A second group of obviously widespread use are the elongated bottles (Nos. 93–95). In Tepe Madraseh vessels of this type were found in three different rooms (T6, W20, and X14); they were also found at Sabz Pushan, Qanāt Tepe, and Village Tepe. As there are no records of the individual sherds, it is impossible to say whether these bottles were used in shades other than blue and colorless, the colors of the examples found at Tepe Madraseh.

These comparisons demonstrate that all the widely circulated vessels were of a simple free-blown or mold-blown type and can be regarded as mass-produced objects. Vessels of costlier design do not seem to have played the same role. It is rather unlikely that these mass-produced vessels were made anywhere other than in the glasshouses of Nishapur.

The finds from the sites Tepe Madraseh, Sabz Pushan, Qanāt Tepe, and Village Tepe show that the main occupational levels are of the ninth and tenth centuries and that the different sites were occupied simultaneously. The excavators also uncovered a few sites that apparently were occupied later, as is best demonstrated by the finds of vessels with applied decoration. It has been seen that at Tepe Madraseh and Sabz Pushan, vessels with applied decoration were few, and the decoration consisted mainly of threads applied hori-

zontally or vertically around the vessel—probably the most typical glass decoration of the ninth and tenth centuries. The stemmed goblet Number 151 is still within this convention. However, the footed beaker Number 152 and the ewer Number 160 show stylistic features of shape and of decoration that point to a later date, probably in the eleventh century. It must be concluded that their find locations, the mound near the Mashhad Road and the kiln site at Qanāt Tepe, had levels of occupation later than the tenth century.

THE USES OF GLASS AT NISHAPUR

The glass finds catalogued in this volume are from different locations, but they all come from one part of the city of Nishapur; therefore the observations that follow do not give a complete picture of the use of glass vessels in Iranian society during Ṭāhirid and Samanid times. However, the finds do permit an interesting overview of a specific group of objects, hitherto not well documented and many of little-known type. Unpretentious vessels were found next to sophisticated ones. Works of top quality are rarely found in excavations, but some of the finds point to the existence of outstanding works in Nishapur, which is important in itself.

The excavations yielded vessels of about 25 different types which with their variations represent approximately 105 different shapes. Roughly equal quantities of undecorated and of decorated glass were found. Although glazed pottery was far more common than glass, glass vessels were obviously preferable or better suited for a number of domestic purposes. Bowls, plates, beakers, jars, bottles, and ewers of a variety of sizes and shapes were probably used mainly as kitchenware and tableware for food and drink. There may have been other uses—as containers for cosmetic liquids, as vessels for storage or transport, and so forth. Glass was also employed for lamps and inkwells and for medical or alchemical purposes. In some buildings it was extensively used for windows.

Sometimes the same shape appears both with and without decoration and in glass objects of varying quality; in other instances, a shape is found in only an undecorated or only a decorated version. Finds like those from the well in Y6 at Tepe Madraseh, including a wide variety of types, show that glass tableware was far more extensively used in the Islamic world than has hitherto been supposed (Clairmont, *Benaki Museum*, p. 105).

Bowls and plates At Nishapur a variety of bowls and plates served different kinds of everyday needs. While small bowls are known to have been used in the Sasanian period, the Nishapur finds are especially rich in bowls and plates of numerous shapes in sizes ranging from small to large. Small bowls with vertical walls (Nos. 1–4, 7–10) were very popular throughout the early Islamic period; at Nishapur, larger bowls of similar shape (Nos. 5, 6, 11–13) and plates were common as well. The large, shallow plates, with folded (Nos. 13, 14) or wide rims (No. 15), have few precursors. Flaring bowls (Nos. 19–27) and bowls with an incurving rim (Nos. 33–36) were also clearly used in greater numbers than before. Only a few of these bowl and plate types are known from other excavations (Ctesiphon, Samarra, Susa), and only a few types have counterparts in ceramics and metalwork.

Since much of the better-preserved material was found in what seems to have been a hoard in the well in room Y6 in Tepe Madraseh, these objects can probably be regarded as typical tableware for a late Samanid household of importance. Finds from future excavations will show whether this surmise is valid. Possibly the larger size of some of this tableware is a characteristic feature. The finds include plates in medium and large sizes with applied decoration (Nos. 148–150) that are identical in form to undecorated free-blown examples. However, most of the other shapes common for undecorated vessels were not utilized for decorated wares.

The range of shapes for glass differed from that for vessels in other mediums. The footed plate (No. 164) seems to be of a shape used only for incised glass of the ninth century, since no example was found in any other glass technique.

Bowls and plates in wheel-cut glass display a repertoire of shapes very different from that of free-blown glass. In many cases the wheel-cut

glass shapes go back to Sasanian models. For instance, shallow plates (Nos. 166, 184), which seem to have been made in many different shapes, were apparently very popular in the early Islamic period: they are known from Samarra (Lamm, *Glas von Samarra*, no. 178, pl. 3, no. 243, pl. 6), Fusṭāṭ (Pinder-Wilson and Scanlon, "Glass... Fustat: 1964–1971," no. 20), and in an outstanding relief-cut version, the aquamarine Buckley bowl, from Iran (Charleston, "Group of... Glasses," p. 215, pl. 2). Thick-walled hemispherical bowls (Nos. 182, 183) are also well known from the Sasanian period. It is not entirely clear whether they represent a continuity or a revival, because little is known of the eighth century in Iran.

BEAKERS AND GOBLETS The cylindrical beaker shape, which is possibly of Syrian origin and is known in examples of late Sasanian blown glass from Mesopotamia, was one of the most popular shapes during the early Islamic period. The mottoes and wishes stamped on pinched examples (Jenkins, "Islamic Glass," no. 17) show that cylindrical beakers were used as drinking cups. With an added wick-holder and handle, the same shape became a portable lamp (Nos. 232, 233). In Nishapur the cylindrical beaker type occurs in a variety of sizes and qualities of glass: free-blown and undecorated (Nos. 37–53), mold blown (No. 123), pinched (Nos. 135ff.), and wheel cut (Nos. 181, 199, 202). It was probably widely used, but it seems gradually to have disappeared in the late tenth century.

The flaring beaker shape was not used for undecorated vessels. With wheel-cut decoration, it was common in ninth-century Samarra (Lamm, *Glas von Samarra*, nos. 172–176; *Excavations at Samarra*, pl. 121), and it occurs with wheel-cut decoration in Nishapur in the second half of the ninth and throughout the tenth century (Nos. 167, 190, 203ff.). A footed beaker with applied decoration (No. 152), an isolated piece, probably dates from the eleventh century. Since the rims of these beakers were not always smoothed either by fire or with a tool, it is difficult to imagine them as drinking vessels; nevertheless this must have been their purpose.

Stemmed goblets, known from the eastern Mediterranean region and common in Sasanian Mesopotamia, continued to be used in the early Islamic period in Mesopotamia (Ctesiphon, Samarra) and Iran (Takht-i Sulaimān). In the Islamic period the stems are usually multi-knobbed, an effect achieved by constriction or cutting. Only one example of this type was found in Nishapur (No. 151); perhaps it was not very common in northeastern Iran in the ninth and tenth centuries.

JARS The number of jars at Nishapur is small. Only miniature jars were found in considerable numbers (Nos. 54–57, 168, 174–176, 178, 179). They occur with or without decoration. Since this type is not known to have existed in the Sasanian period, the miniature jars may reflect special needs of the Islamic society.

BOTTLES Small bottles were common in Nishapur. Only the simplest type, usually carelessly worked, exists in quantity (Nos. 65–86). Other kinds of small bottles were found in limited numbers. This is especially the case with four-footed "molar" flasks (Nos. 186–189). Many of the small bottles are thought to have been used for cosmetic liquids or powders. It is said that casually made small bottles were used as inkwells in Samarra, but whether they were so used in Nishapur is not known.

Medium-sized to large bottles can be grouped according to their presumed use. Some of them seem to be purely utilitarian (Nos. 89–97, 107) and were probably used for special purposes unknown to us. This is especially true of the elongated bottle type (Nos. 93–95) found in nearly all the excavated sites at Nishapur. The walls of this type of bottle are thin, making it extremely fragile and not suitable for transport. Perhaps it was used to store liquids. Other bottles may have been tableware. Some shapes are common in various kinds of glass: undecorated free-blown (Nos. 108, 109), mold blown (Nos. 133, 134), and wheel cut (Nos. 171, 172, 227). Long-necked bottles (Nos. 173, 225), which were found only with wheel-cut decoration, may have been used for rose water or other precious liquids. Chance finds said to be from the Gurgān region indicate that these bottles may have had

caps made of precious metals, silver or gold (*7000 Years*, no. 603; *Arts of Islam*, London, no. 125).

Most bottle shapes are known from Mesopotamian glass finds of the early Islamic period (Ctesiphon, Samarra) and seem typical for the Islamic world. Some shapes go back to types known from the Roman glass finds at Dura-Europos. The square bottles commonly used for transport purposes in Roman times do not occur in the Islamic period, except for small bottles (Nos. 98, 99) or the related molar flasks.

EWERS Ewers excavated at Nishapur are of different shapes. One type (Nos. 141, 169, 228) is known from unglazed pottery and was called a drinking pitcher by Wilkinson (*Nishapur: Pottery*, pp. 336–41). It is not known whether glass ewers were put to similar use. Spouted ewers (Nos. 111, 160, 161), which in shape developed from Sasanian ewers (Blair, *History of Glass*, pp. 334 ff., colorpl. 9, pl. 103), may have been used as tableware. While most of the ewer shapes excavated seem to have been in use in the ninth and tenth centuries, the ewer with applied decoration (No. 160) represents a slightly later type and is datable to the eleventh or twelfth century. Later ewers show a more pronounced foot than earlier ones.

THE GLASS TRADE

No recorded finds testify to Nishapur's having been a glass-trading center. No glass factory or workshop was unearthed, and none of the excavated fragments appear to be cullet brought to a Nishapur glass factory from some distant place.

Nor have the excavations yielded any glass finds that could with certainty be called imports, although the very nature of glass-making makes it extremely difficult to distinguish between a local and an imported product. To a limited extent, a glass can be identified as imported if it displays a color, handling of the material, or style not to be found among other vessels from the locale.

"Despite the evident communications network [of the early Islamic period], pottery was not under normal circumstances transported overland for great distances. The exceptions were types representing a complex technology which was hard to imitate, such as polychromy, lustre, or porcelain, and these made up only a minute proportion of the pottery used or traded locally." This statement, made by Andrew Williamson ("Regional Distribution," p. 20), is likely to be valid for glass as well. In general, then, one can probably rule out the importation of glass vessels of simple technique to a region known to have produced glass.

However, finds show that undecorated glass vessels of a simple type were exported from the Near East as far as China (Pinder-Wilson, "Glass in Asia"; An Jiayao, *Early Chinese Glassware*; idem, "On Early Islamic Glasses"; idem, "Dated Islamic Glass"). With some of those vessels it is likely that the contents, perhaps precious liquids, were the imported goods, and that their glass containers were then kept, being objects of interest in a society where glass-making was not well known or generally practiced. Since this cannot have been true of simple open vessels like beakers, it may also be that glass vessels were traded for their own sake, as were porcelains and other ceramic vessels. (In fact, both kinds of importation probably took place. Objects traded to China included not only undecorated, mold-blown, and pinched glass, but also vessels with applied decoration and glass made by more sophisticated techniques.)

At Nishapur, technically simple glass finds are unlikely to be imports. The only vessels that might conceivably be imports, because their manufacture required sophisticated techniques, are the luster-painted, incised, or wheel-cut glasses (Nos. 163–228). However, there are no positive indications that any of these vessels are imported. The only luster-painted fragment found at Nishapur (No. 163) is not of the high quality that would justify calling it an import. There is no evidence that the incised vessels Numbers 164 and 165 or indeed any of the wheel-cut vessels Numbers 166–228 are imports. Not one of these vessels displays technical or artistic traits that would suggest its importation from a glass center. During the ninth and

tenth centuries the city was thriving artistically and its craftsmen seem to have been at the height of their powers; thus there is no discernible reason why glass should have been imported. And if a local glasshouse was able to produce the many sophisticated wheel-cut vessels found at Nishapur it would also have been capable of producing molar flasks, like Numbers 186–189, which are usually attributed to Egypt. Only the discovery of additional finds from other sites will enable us to determine which of the Nishapur vessels, if any, are imports.

The question whether glass was exported from Nishapur is also difficult to answer. We do have an indication that glass was exported to Sweden from Iraq or Iran. The ninth-century cylindrical beaker from Birka (Fig. 13, p. 152), with its stylized bird, shows a relation to the Nishapur beaker Number 202. Although the execution of its wheel-cutting is crude, it must be kept in mind that the beaker was probably painted, obscuring the crudeness. More important than this beaker are the six dark blue plates with incised decoration found in the Famen Temple in China in a crypt that was sealed in A.D. 874 (see p. 8). Their style shows affinities with that of Number 164, suggesting that the plates might have been imported from Nishapur (An Jiayao, "Dated Islamic Glass," pp. 123–28). In principle, it is also possible that these plates and the two fragments found at Nishapur come from a glass center other than Nishapur, for example one in Iraq or Syria.

Pottery from China is among the Nishapur finds (Wilkinson, *Nishapur: Pottery*, pp. 254–55), and glass may have been traded from Nishapur to China on the return journey. Wilkinson suspected that Chinese pottery reached Nishapur through Iraq, although it also came via Transoxiana along the Silk Road; glass too may have been traded along these routes. It should be mentioned that pottery originating in Transoxiana was also traded to Nishapur, whereas we have no hint of such a trade in glass.

In the West, glass finds in Fusṭāṭ (Old Cairo) prove quite convincingly that sophisticated cut glass was brought there from Iran in the ninth century. Although the glass cannot be assigned a provenance, Nishapur is a possibility (see Pinder-Wilson and Scanlon, "Glass... Fustat: 1972–1980," no. 15, an example from the second half of the ninth century). Because the glass produced in Nishapur glasshouses was of a high standard, there was probably not much glass made elsewhere that surpassed in technique or style what was already available in Nishapur, and thus imports from other centers are likely to have been infrequent and exports fairly common.

THE SIGNIFICANCE OF THE NISHAPUR GLASS FINDS

SASANIAN PERIOD The glass objects found at Nishapur must be considered against the background of the preceding period for their significance to be fully understood. From excavated and chance finds in Iran and Iraq we have learned about the widespread use of glass during the Sasanian period and the high standard achieved by Sasanian glass artists, especially in cut glass: the faceted glass vessels produced by these craftsmen are well known. The Sasanian glass industry served the Sasanian court and the nobility and supplied ware as well for the everyday needs of the general public. Excavations in the region of the Sasanian capital, Ctesiphon, have shown that glass played a significant role (Negro Ponzi, "Glassware from Choche"; idem, "Late Sasanian Glassware from Tell Baruda"; Kröger, *Parthisches... Glasfunde von Ktesiphon*). Craftsmen from the West, most likely from Syria, were active at Ctesiphon and probably were responsible for the mosaics and glass inlay in the Sasanian palace Tāq-i Kisrā.

There were a number of other important glass-making centers in Iraq and Iran and also numerous regional glassworks to meet the daily needs of a large public (Negro Ponzi, "Sasanian Glassware from Tell Mahuz"; idem, "Glassware from Abu Skhair"). So far we have no very firm idea where the major glass-producing centers of the Sasanian empire were. There is no evidence for the existence of an important glass-making center in northeastern Iran. Nishapur can in any case be ruled out because it was not a major city

in Sasanian Iran. The likelihood is, then, that Nishapur's glass-making activity during the Islamic period represented not the renewal of an old practice but the start of a new one.

Sasanian glass was made for everyday use, just as had been the case in the days of the Roman empire. Even the famous faceted vessels, some of which were traded to China and Japan and other parts of the world, apparently were of a rather widely used type that was produced at significantly different levels of quality (Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 170–206); it is reasonable to assume that only the finer examples were exported. The faceted vessels may not have been the only high-quality glass products. It has been suggested that Sasanian glassmakers manufactured glass and rock crystal vessels with a variety of decorative motifs (Charleston, "Glass," p. 299). Figural decoration depicting humans and animals probably played a greater role than has been imagined.

ISLAMIC PERIOD So far, little is known about high-quality glass produced during the Umayyad period. It seems, in general, that glass-making continued at an active level throughout the newly Islamic world, and that some centers of manufacture soon reached new heights. This is demonstrated by the luster glass of the eighth century found in Fusṭāṭ in Egypt (Pinder-Wilson and Scanlon, "Glass . . . Fustat: 1964–1971," no. 23); equally fine work can be assumed to have been done in other important centers in Syria and probably in Iraq (Ettinghausen, "Early Islamic Glassmaking Center").

The high standard of Sasanian glass-making clearly contributed to the development of outstanding glasswork in the early ʿAbbasid period, known in examples from Samarra in Iraq, which for a time was the ʿAbbasid capital. By the ninth century, new shapes and new styles of glassware had been developed for different groups within urban Islamic society. Artists were probably brought to the ʿAbbasid court from various centers. They developed an Islamic style of glass decoration which drew on the ornamental, plant, and animal motifs in the late Roman and Sasanian repertoire. As with the other arts, a process of absorption and transformation resulted in the development of a new stylistic language (Lamm, *Glas von Samarra*; *Excavations at Samarra*). Samarra reached its artistic zenith in the ninth century; the city was no longer the caliphal residence after 892. Large quantities of common glass, as well as vessels decorated in relief-cut, linear, and slant-cut styles, were used in Samarra, apparently contemporaneously (see discussion on p. 6).

The style that developed under the ʿAbbasid caliphate radiated outward to other parts of the Islamic world. Finds from Fusṭāṭ show that a variant of this style existed in Egypt from the ninth century onward, and the Nishapur finds are proof of the caliphal style's impact in Iran. To those finds must be added masterpieces such as the Buckley ewer (Oliver, "Islamic Relief Cut Glass," fig. 9), which very likely comes from Iran, but from an unknown site. Thus one can assume the existence of glass centers in both Egypt and Iran that looked to standards set by contemporary caliphal ateliers in ʿAbbasid Iraq while at the same time they were developing their own styles.

The Nishapur finds do not answer the question, Was there a particular connection between Iranian glass artists and artists working at the Egyptian glass center in Fusṭāṭ? Often, glass objects made in the two locations carry designs that must have a common source, but there are stylistic differences between the designs as carried out in Iran and in Egypt (compare Pinder-Wilson and Scanlon, "Glass . . . Fustat: 1964–1971," no. 20, with Oliver, "Islamic Relief Cut Glass," p. 14, fig. 9, and the same Fusṭāṭ publication's no. 21 with Scanlon, "Note on . . . Trade," pp. 268–69, figs. 2, 3). And while the artists in Egypt a little later produced the well-known Fatimid rock crystal vessels, Iranian artists seem to have excelled mainly at work in glass. Present knowledge suggests that the stylization of plants and animals seen on Fatimid rock crystals did not depend on Iranian models. Rather, it sprang from the same roots as the work of Iranian artists did; that is, the style that developed in ʿAbbasid Iraq (see Fig. 10, p. 143).

Other centers, such as Dwin in Armenia, were also dependent on the caliphal style, even though major works were imported to the city

from within the ʿAbbasid empire (Janpoladian, *Medieval Glassware*; Janpoladian and Kalantarian, *Trade Relations*). As further excavation results are published, the scope as well as many details of this period style will be revealed.

Nishapur's glass finds come mainly from the site of Tepe Madraseh, possibly a group of buildings of some official character, and from a number of other sites of a more urban nature, all part of the sizable city of Nishapur. Nishapur's cultural zenith was reached in the ninth and tenth centuries. While a number of the glass finds are from the ninth century, the main body of excavated glass is tenth-century work. Only a small group can be dated to the eleventh century.

The region that includes Nishapur was one of the political centers of the early Islamic period. Beginning in the ninth century, local dynasties developed considerable independence from the ʿAbbasid caliphate, and Khurasan evolved into an important province, of which Nishapur was a major city.

The Sasanian heritage was an important factor, but in particular the region was inspired both politically and culturally by the standards set at the center of the ʿAbbasid caliphate. The organization of the state was modeled after the caliphal court, and the styles of artistic production depended on a taste developed by the ʿAbbasids. However, finds confirm that "Nishapur, despite its known importance, neither equaled the seat of the caliphate as a center of fashion nor had the power to draw to itself the most valued and expert of Islamic potters" (Wilkinson, *Nishapur: Pottery*, p. 180), a judgment that can just as accurately be applied to glassmakers.

The excavations give a clear picture of how extensively glass was used in an urban Islamic society. As it had been in the Roman world, glass in the Islamic world was mass-produced; like ceramics, glass was a commercial product whose principal market was the middle class (Watson, *Persian Lustre Ware*, p. 20). Vessel types popular in Egypt were also common in Iran, and in fact it seems characteristic of this material that it was used throughout the Islamic world, with sometimes only insignificant regional variations. In some cases so uniform a type was employed across a large geographical area that there is no distinguishing feature to signal an object's place of origin (e.g., Nos. 186–189). On the other hand, many of the decorated glass types vary stylistically according to the area in which they originate (see the discussion of pinched glass, pp. 95–96). Obviously there were multiple models, a subject that needs further research.

The simple, undecorated glass that was used in ninth-century Samarra has numerous parallels among the Nishapur finds. As more examples of undecorated glass come to light and as more Islamic glass objects emerge from excavations beyond the Islamic world, for instance in China, it is becoming obvious that this kind of material was highly valued in societies where comparable wares were not produced.

Indeed, it should be kept in mind that in addition to objects of outstanding quality (such as Nos. 160, 164, 172, 180, 184, 192–194, 197, 225, 228), a great many unpretentious, functional vessels made without much regard for aesthetic quality were in use in a city like Nishapur (Nos. 91, 93, 96, 97, 107; see also the remarks on Nishapur pottery in Ettinghausen, "Flowering," p. 114). Decorated vessels too could be crudely executed (Nos. 217, 218), and some vessels of sophisticated type, such as ones with wheel-cut decoration, can hardly be called successful (Nos. 182, 183, 219). In this they resemble the previously mentioned Sasanian faceted bowls from the Ctesiphon region. The ninth-century beaker from Birka in Sweden (Fig. 13, p. 152), surely not one of the masterpieces of Islamic wheel-cut glass, is nevertheless extremely valuable as historical evidence. Islamic glass finds from China, gradually becoming better known through the work of An Jiayao and others, are of utmost importance because they are datable—many of them exactly—making them key documents for the dating of Islamic glass. These finds are examples of simple vessels (rather than works of high artistic quality) that were traded from Islamic countries. In fact, of greater interest for the student of Sasanian and Islamic cultures than specific artistic masterpieces is the high general standard reached by glasshouses within these societies.

In the Islamic world, glass was made everywhere, and there is ample evidence that everyday

glass needs were met in practically all regions of Iran. However, glass finds show that northeastern Iran was the center for the manufacture of high-quality glass during the ninth and tenth centuries (the same was true of metalwork and ceramics). Generally, this finer glass comprised such varieties as luster or painted glass, incised glass, and wheel-cut glass. It is clear that during the Ṭāhirid and Samanid periods, Nishapur was one of the centers for manufacture of these kinds of glass. Although it seems unthinkable that the Buyid center Rayy, for example, should not also be one of those cities where vessels of a high quality were made, we must await further excavations for evidence of other artistic centers in Iran.

The period of the Nishapur finds is precisely the time when Islamic glass manufacture in Iran reached its finest point. During the ninth and tenth centuries, glass vessels of both decorated and undecorated type were being mass-produced in great numbers, a range of outstanding individual works were crafted, and a generally high technical level had been reached. True, not many masterpieces have been unearthed, but such objects are not likely to be found with any frequency in excavations (Saldern, "So-called Byzantine Glass," p. 130): treasuries were usually plundered or destroyed in the course of time, and in an Islamic society, graves do not yield finds. It is for this reason that objects in European treasuries or from shrines and graves in China and Japan assume such importance in the study of Islamic glass.

Also found at Nishapur are glass objects made in a variety of wheel-cut techniques that are known from excavations in Samarra. They include relief-cut vessels and vessels decorated in the linear and the slant-cut style, all of which, as at Samarra, existed contemporaneously. Each style underwent its own development: while relief-cut glass apparently flourished in the ninth century and continued in the tenth century, the slant-cut style seems to have come much more to the fore in the tenth century. Until more is learned, we can only speculate on whether these gradual changes reflect shifts in taste or in consumers' needs.

About the end of the tenth and the beginning of the eleventh century, transformations took place that are not yet fully understood. The manufacture of wheel-cut glass probably came to an end about the middle of the eleventh century. Meanwhile the working of glass in two other techniques—mold blown and with applied decoration—showed a new stylistic approach. The patterns changed, and some of the new designs evidently were meant to imitate wheel-cut patterns. Old motifs, such as disks, facets, and certain stylized animals and plants, disappeared from the Iranian glass repertoire and were replaced by new motifs (Charleston, *Masterpieces*, pl. 31; Kröger, *Glas*, nos. 79, 86, 88, 89, 136, 138, 139; Kordmahini, *Glass*, pp. 53–71). Some techniques, for example pinching, also vanished, along with certain vessel shapes, such as the cylindrical beaker.

For reasons still to be explained, Iran did not participate in the manufacture of enameled glass, a major Islamic contribution to the history of glass that is known to have been practiced in Syria and probably in Egypt from the twelfth century. Enameled glass represents a very different approach to the material, in which glass becomes a medium similar to painted pottery. Strikingly, the production of luster pottery in Kāshān in central Iran, which flourished from 1170 to 1340, was without a counterpart in glass. In fact, the manufacture of glass in Iran never again reached the heights it had during the early ʿAbbasid period, although glass continued to be produced for daily needs. The reasons for this falling off and for the changes noted in glass manufacture, although not yet determined, are perhaps to be found in the advent of Turco-Mongol dynasties such as the Seljuqs and the Īl-Khānīds, which favored materials other than glass (Lentz and Lowry, *Timur*, pp. 221–26).

Many questions about glass manufacture in early Islamic Iran still await answers. Nevertheless, the Nishapur excavations have contributed a great deal to our knowledge about the use of glass and the exploitation of its technical and artistic possibilities by the early Islamic society of northeastern Iran.

Catalogue

NOTES TO THE READER

Information presented for each glass find includes the excavation year, provenance or site where found, and findspot. Color and dimensions are specified to the extent possible. A brief visit to Iran in 1992 permitted the inspection of a very limited number of vessels there, but only the finds in The Metropolitan Museum of Art in New York have been thoroughly examined by the author; thus, not all of the excavators' statements could be checked. Descriptions of the finds utilize the excavators' records, amplified by direct observation whenever possible. Accession numbers are given for the objects now in The Metropolitan Museum of Art, abbreviated MMA. Funding for their accession came from the Rogers Fund. Numbers are given for objects in the Iran Bastan Museum in Tehran when available.

Seventy-nine objects in this catalogue belong to a group of finds that were drawn and/or photographed during the excavations and then were discarded. All other finds of which some mention was made by the excavators have also been discussed in this catalogue. Information on the discarded finds had to be derived exclusively from the excavators' records, including their designations of glass color, which therefore depart from the scheme otherwise adopted here. The state of preservation of the discarded objects is described on the basis of photographs or notes; in cases where these did not exist, no description is given.

An unknown number of additional finds, probably sherds, were discarded without anything about them having been recorded. Their existence is known of only because they inform drawings of more complete objects of the same type.

The extent of weathering is indicated only for the objects in New York. A number of vessels in the Metropolitan Museum were completely cleaned, freed of older restorations, and newly restored by Pia Busch in Bad Homburg, Germany, in the summer of 1974. Since in those cases the original patina was lost, the weathering is described according to the excavators' photographs.

Most of the catalogue photographs reproduced here were taken at the time of excavation. About twenty-five others were taken at the Metropolitan Museum following accession of the objects. Photographs of Numbers 78, 82, 165, 182, 208 bottom, 214, 226, 228 center, 236, and 247–292 were made by Joseph Coscia of the Museum's Photograph Studio especially for this publication.

Drawings were made at the time of excavation by Lindsey F. Hall, Charles K. Wilkinson, and probably a third draftsman. They are reconstructions of the vessels, often done on the basis of fragments. Drawings of Numbers 5, 6, 11–13, 15, 16, 24, 25, 27–30, 35, 36, 46, 51, 79, 91, 102, 114, 136, 138, 140, 149–151, 153, and 242 are signed by Lindsey F. Hall and dated between July and September 1939. Originally a good many more drawings existed, but they were unfortunately lost about 1960 and have not reappeared. The drawings were inked for publication in Berlin by Konstanze Kitt, who also made the drawings for Numbers 121, 180, 198, 199, 201, 211, and 212, and for Figures 10–12 and 17. Figure 16 was drawn by Christiane Koken. The profile of Number 193 was drawn by Abdullah Kahil.

Free-Blown Vessels

BOWLS AND PLATES

Thirty-six bowls and plates are presented here, of which twenty-seven were excavated in Tepe Madraseh and nine in Sabz Pushan. The well in Y6 of Tepe Madraseh yielded twenty of these vessels, providing examples of nearly all the types catalogued here.

All the bowls are free-blown but were then brought to their completed form by tooling, as numerous marks on the walls and rims testify. The vessels can be grouped according to shape and certain characteristics of manufacture.

The glass most frequently used is colorless with a greenish or yellowish green tinge. Other colors employed are bluish green, greenish blue, and light blue. Only three bowls of completely colorless glass were found, although that type of glass was very popular for beakers, including cut and engraved beakers. The larger bowls and plates show many irregularities in color. The bases of these vessels can be quite thick. While in some cases the base is even, on other examples it has a pronounced kick. Noteworthy are the bulges on the bases of the large plates Numbers 15–18.

The bowls and plates catalogued here form the largest corpus of glass bowls and plates from Iran ever published, and few excavations have yielded so large a number of relatively intact bowls. The Nishapur finds are particularly valuable because they show the whole wide range of these simple utilitarian vessels. Many bowls and plates of similar shape have been found in other places, but it is usually quite difficult to date such simple vessels when they are scattered finds. The dating of the Nishapur finds is a subject that can profitably be addressed. Questions of the dating of this material are considered below, mainly in the discussion of the finds from the well in Y6.

Of the various shapes of free-blown bowls from Nishapur, only one, the beaker shape, also appears among the decorated vessels. Most types of bowls with cut or engraved decoration have forms that differ from those of free-blown bowls and evidently stem from a different tradition.

Bowls with vertical walls

The bowls with vertical walls display variations in shape, dimensions, type of glass, and qualities of workmanship.

The bowls Numbers 1–7 have a straight rim which in most cases was smoothed by fire polishing. Only four small to medium-sized bowls of the type with a short vertical wall were found (Nos. 1–4); the base can be nearly plain (Nos. 1, 2) or with a kick of some sort (Nos. 3, 4). The diameter of the base can be about twice the height of the wall or considerably larger. This type of bowl is well known from other excavations. However, none of the examples found in Nishapur are of as high a quality as the bowls from Samarra. No examples of this type are known from the Sasanian period; it may well be that the type was introduced into Iran from Mesopotamia.

Numbers 5 and 6 are of a type similar to the first four but are much larger. Both are from the well in room Y6 at Tepe Madraseh, and since they show the same kind of workmanship as Numbers 1–4, in all probability they are from the same glasshouse. Number 5 may have had the same kind of protruding pontil mark as Number 6; however, its base was incomplete. Number 7 is unlike the others in shape and in the color of the glass, which is described by the excavators as having a lavender tinge.

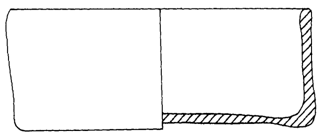
Numbers 8–10 are medium-sized bowls with the rim folded outward. All three were blown from a colorless glass with a greenish tinge. The wall is more or less vertical but can show some irregularities, as Number 10 does. The bowls are from three different findspots in Tepe Madraseh. Simple bowls of this kind, typical for many sites, are datable to between the eighth and tenth centuries.

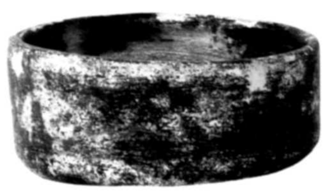
Numbers 11 and 12 stand somewhat apart because they are larger and have rims with a complex profile, but they belong to this general group.

1. Bowl

Colorless. Patchy grayish white incrustation; iridescence
H. 2.2 cm; Diam. 5.9 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh, W20, middle level
MMA 40.170.135

Complete. Base with shallow kick, pontil mark. Somewhat irregular vertical-walled body.





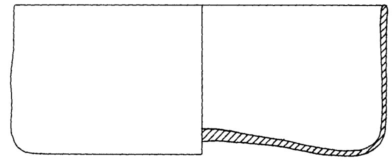
For cylindrical bowls of this type of various sizes, see Lamm, *Glas von Samarra*, pp. 7ff., pl. 1 (nos. 5ff.); Lamm, *Glass from Iran*, pl. 10:G, I, K; Kröger, *Parthisches...Glasfunde von Ktesiphon*, nos. 548ff. Shinji Fukai published a bowl of this type, describing its color as purple and its date as first to third century (Fukai, *Persian Glass*, pl. 17). No published find matches it in both shape and glass color. For finds from Dwin, see Janpoladian, *Medieval Glassware*, pls. 3–5 and the drawing on pl. 4:4.

---

2. Bowl

Colorless, greenish tinge
H. 4 cm; Diam. 8.2 cm
9th–10th century
1939; Tepe Madraseh, drain in S6, bottom gatch level
Discarded

Small parts of wall missing. Kick-base.





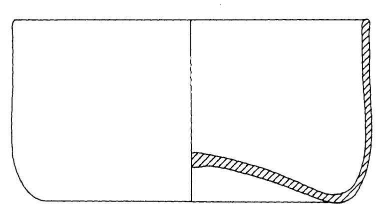
2

---

3. Bowl

Colorless, greenish tinge
H. 4 cm; Diam. 8 cm
9th–10th century
1939; Sabz Pushan, well in B
Discarded

Fragment making possible a drawing. Kick-base with pontil mark in the center.

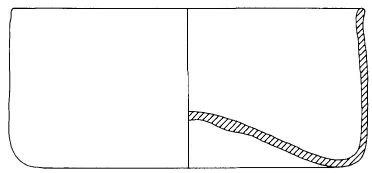


---

4. Bowl

Colorless, greenish tinge
H. 4 cm; Diam. 9.3 cm
9th–10th century
1939; Sabz Pushan, well in B
Discarded

Fragment making possible a drawing. Kick-base with pontil mark. Rim with a slightly elaborated profile.

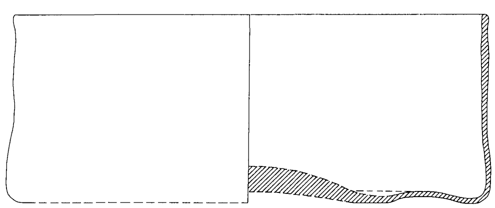


4

5. Bowl

Greenish blue
H. 6.6 cm; Diam. 17 cm; Th. at rim 0.2 cm
10th century
1939; Tepe Madraseh, well in Y6
Discarded

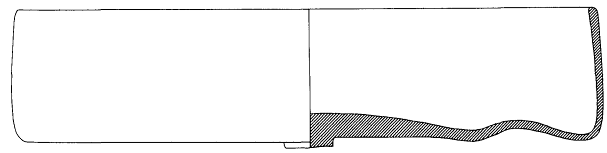
Fragment making possible a drawing. Kick-base with thick center and bulge. Thin vertical wall.



6. Bowl

Colorless, yellowish green tinge
H. 6.5 cm; Diam. 30 cm; Th. at rim 0.5 cm
10th century
1939; Tepe Madraseh, well in Y6, high level
Tehran, Iran Bastan Museum

Broken, mended; some fragments missing. Flat, thickened center with rough pontil mark (diam. 2.5 cm) and bulge on the base. Wall slightly tapering toward the top.

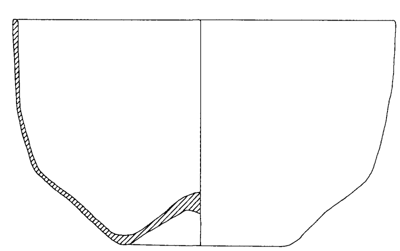




6

7. Bowl

Colorless, greenish lavender tinge
H. 6.7 cm; Diam. 11.9 cm
10th century
1939; Sabz Pushan, well in 9D
Discarded

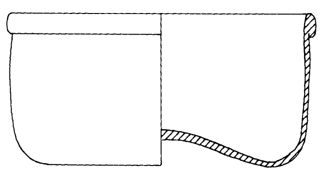


Fragment making possible a drawing. Thickened base with deep kick. Wall flaring at first, then rising steeply to a near vertical.

A somewhat similar vessel is known from Dwin; see Janpoladian, *Medieval Glassware*, pl. 13:2. However, since the Nishapur find was just a fragment, a relationship between the two vessel shapes cannot be regarded as certain.

8. Bowl

Colorless, greenish tinge
H. 3 cm; Diam. 6.3 cm
10th century
1939; Tepe Madraseh, well in X8, second floor (high level)
Tehran, Iran Bastan Museum





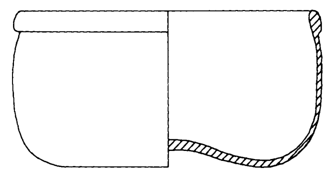
Section of wall missing. Kick-base with pontil mark. Rim folded over to the outer wall.

Although bowls and plates with folded rims were probably known from the Sasanian period onward, the feature seems to have been more common in the ninth and tenth centuries than it had been earlier. See Adams, "Tell Abū Sarīfa," pl. 7, fig. 15; Kröger, *Parthisches...Glasfunde von Ktesiphon*, nos. 862–66.

9. Bowl

Colorless, greenish tinge. Extensive corrosion
H. 3.4 cm; Diam. 7.3 cm
10th century
1939; Tepe Madraseh, W21, high level
MMA 40.170.134

Complete. Of the same type as Number 8.



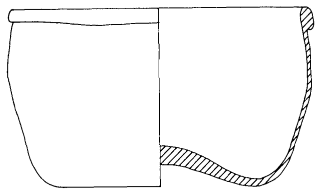


10. Bowl

Colorless, greenish tinge
H. 4 cm; Diam. 7.1 cm
10th century
1939; Tepe Madraseh, pit in X13 or W21, high level (different findspots given on the excavation drawing and on the photograph)
Tehran, Iran Bastan Museum

Complete but cracked. Similar to Number 8 but with a higher, somewhat irregular wall.

For related bowls from Dwin, see Janpoladian, *Medieval Glassware*, pls. 5, 6 (drawing). Also see examples in Abdurazakov et al., *Steklodeliye Srednei*, fig. 12:4.

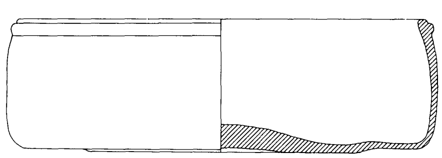


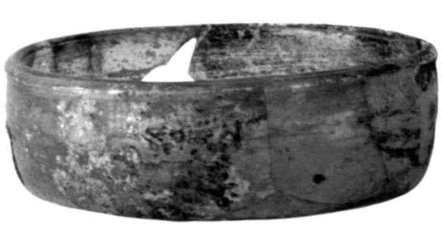


10

11. Bowl

Colorless, yellowish green tinge. Patchy corrosion
H. 4.7 cm; Diam. 15 cm
10th century
1939; Tepe Madraseh, well in Y6, high-level gatch
MMA 40.170.130





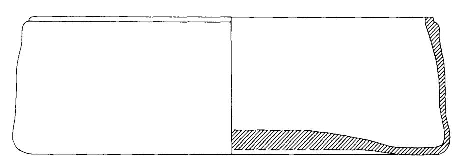
Broken, mended; missing areas now restored. Thick base with shallow kick in center, rough pontil mark. Groove on base near wall. Vertical wall folded to the inside, producing a rim with a complex profile.

For bowls of similar shape but with a rim of slightly different profile, see Abdul Khaliq, "Glass Objects," p. 51 and pl. 4, no. 33, and Jenkins, "Islamic Glass," no. 4 (eighth–ninth century). Late Sasanian or early Islamic-period bowls from the church in Ctesiphon have a related rim profile; see Kröger, *Parthisches ...Glasfunde von Ktesiphon*, nos. 511–15.

12. Bowl

Greenish blue
H. 5.5 cm; Diam.: lower part 18 cm, rim 17.2 cm
10th century
1939; Tepe Madraseh, well in Y6
Discarded

Fragments making possible a drawing. Similar to Number 11. Thickened base, slightly raised except at edge.



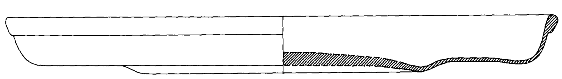
Plates with rim folded outward

The two plates Numbers 13 and 14, both of the same bluish green glass, have the rim folded outward. Their large dimensions are without precedent. The base of Number 14 is very thick at the center. One wonders whether these large pieces

were actually used as tableware. They could have been plates or even trays, but they might also have served some other purpose. Because of their thin walls, plates of this size would have to be handled very carefully. With their outward-folded rims, these plates are related to the bowls Numbers 8–10.

13. Plate

Bluish green
H. 3.1 cm; Diam. 31.6 cm
10th century
1939; Tepe Madraseh, Y6
Discarded

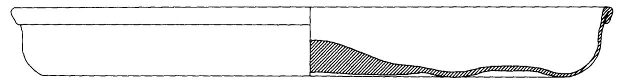


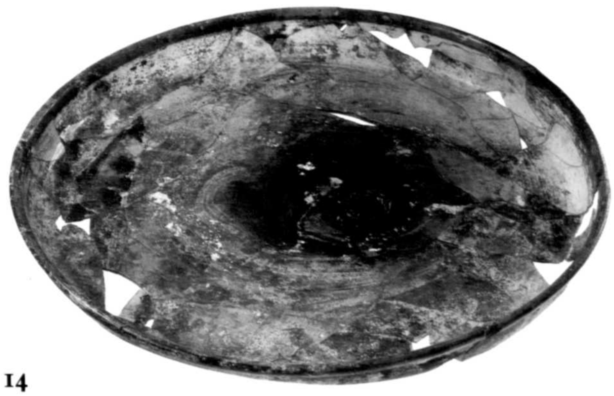
Fragment making possible a drawing. Large plate with flat, thickened base with bulge in the middle, making it too uneven to function well as a stand. Wall short and flaring, with rim folded to the outside.

---

14. Plate

Bluish green. One large bubble, many small ones; numerous streaks showing flux of the glass
Patchy corrosion
H. 4.2–4.5 cm; Diam. 40 cm
10th century
1939; Tepe Madraseh, well in Y6, high level
MMA 40.170.137





14

Broken, mended; missing pieces now restored. Large plate; irregular, thickened kick-base. Short, flaring body, rim folded outward. Does not stand securely because of irregularities.

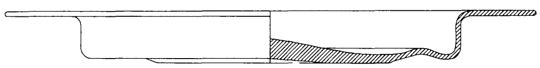
Reference: Wilkinson, *Nishapur:...Buildings*, p. 151, fig. 1.175.

Plates with a wide rim

The plates Numbers 15–18, all with wide rims, form a group. All four are from the well in room Y6 in Tepe Madraseh. Number 15 is mentioned as being from a high level in the well; for Numbers 16–18 no level is given. The kind of glass varies and there are some differences in manufacture, but all the plates have similar dimensions. The shape is characterized by a shallow interior and a wide rim. A pronounced bulge near the wall is typical for these plates, as for others found in this excavation. No comparable flat glass plates are known; however, the type has counterparts in pottery and metalwork of the seventh to ninth century.

15. Plate

Colorless, yellowish green tinge. Patchy corrosion; iridescence
H. 2.1 cm; Diam. 21.9–22.5 cm
10th century
1939; Tepe Madraseh, well in Y6, high level
MMA 48.101.269a–d



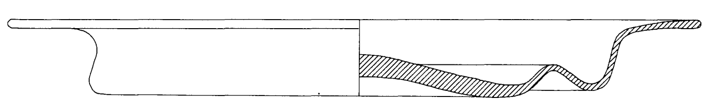


Broken, some pieces joined. Two-thirds of wall and rim missing. Surface texture shows plate was tooled on an uneven ground. Thick kick-base with rough pontil mark (diam. 2.2 cm; pontil rod: diam. 1.4 cm; th. of wall, 0.3 cm). Bulging ring on base near wall. Vertical wall flaring to a rim 3.3 centimeters wide. For a plate of comparable shape but slightly smaller, from Samarra, see Lamm, *Glas von Samarra*, pp. 15–16, fig. 2, no. 3. For shallow plates with and without decoration from Khulbuk, see Abdurazakov et al., *Steklodeliye Srednei*, figs. 18:1, 18:2. Not enough is known to say whether the shapes of these glass plates show the influence of metalware. For a good example of a flat metal dish, possibly of the late seventh or eighth century, see Melikian-Chirvani, *Islamic Metalwork*, p. 26, fig. 1.

16. Plate

Greenish blue. Many small bubbles. Patchy corrosion; iridescence
H. 2.5 cm; Diam. 21.5–21.8 cm; Th. at rim 0.2–0.3 cm
10th century
1939; Tepe Madraseh, well in Y6
MMA 40.170.60

Broken, mended. Kick-base with large pontil mark (diam. 2.3 cm) creating bulge in center; bulging ring on base near wall. Flaring rim 2.6 centimeters wide. Many short stripes on the rim, perhaps the result of tooling with a reamer. Evidence that plate was worked on a sandy ground. Color appears lighter on rim, which is thinner than base.





16

17. Plate

Blue
H. 3.6 cm; Diam. 23.4 cm
10th century
1939; Tepe Madraseh, well in Y6
Tehran, Iran Bastan Museum

State of preservation not known. Plate similar to Number 16.

18. Plate

Blue
Dimensions not known
10th century
1939; Tepe Madraseh, well in Y6
Discarded

State of preservation not known. Plate similar to Number 16.

Flaring bowls

The bowls Numbers 19–25 form a distinctive group: small to medium-sized bowls with a kick-base and a flaring, usually thin, rounded wall that has no special rim treatment (except for Number 25, which has a profiled rim). The bowls Numbers 26 and 27, both from the well in room Y6, are similar in shape and dimensions and have identical details, a folded footring and a slightly profiled rim. The presence of numerous horizontal grooves from tooling is typical for these bowls.

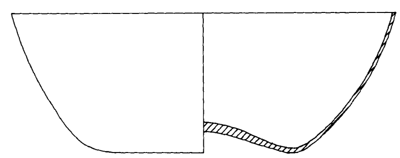
Flaring bowls are known from the Sasanian period onward. Since complete examples are rarely found, the feature of the folded footring is seldom seen.

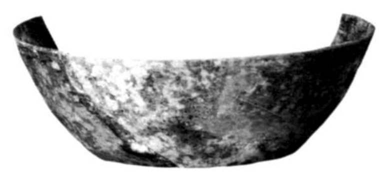
19. Bowl

Colorless, greenish tinge
H. 3.4 cm; Diam. 9.8 cm
10th century
1939; Tepe Madraseh, well in court of X8, second high level
Discarded

One-third missing. Thickened kick-base, flaring wall.

For a tenth-century bowl of this type with a folded rim, see Kiani, *Islamic City*, fig. 46, pl. 49, no. 3.

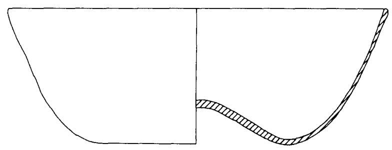


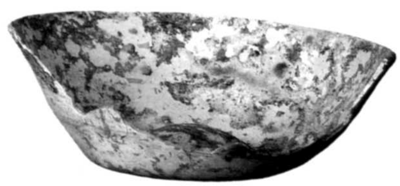


20. Bowl

Colorless, greenish tinge. Completely corroded; iridescent
H. 3.7–4.1 cm; Diam. 10.8 cm; Th. at rim 0.1 cm
10th century
1939; Tepe Madraseh, well in court of X8, second high level
MMA 48.101.266

About one-third missing. Kick-base; flaring, slightly irregular wall. Rim slightly thickened.





20

21. Bowl

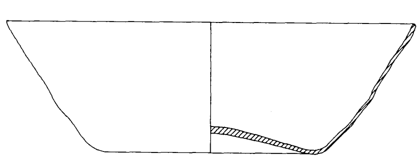
Colorless, greenish tinge
H. 3.5 cm; Diam. 9.7 cm
10th century
1937; Sabz Pushan, *zir-i-zamin* in 6D
Tehran, Iran Bastan Museum

Broken, mended; part missing. Similar to Number 20.

22. Bowl

Colorless, greenish tinge
H. 4.1 cm; Diam. 13 cm
10th century
1939; Sabz Pushan, well in B
Discarded

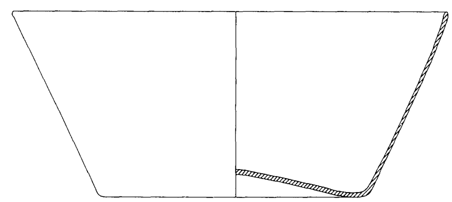
Fragment making possible a drawing. Similar to Number 20.



23. Bowl

Colorless, greenish tinge
H. 7.3 cm; Diam. 17.2 cm
10th century
1939; Sabz Pushan, well in B
Discarded

Fragment making possible a drawing. Similar to Number 21.

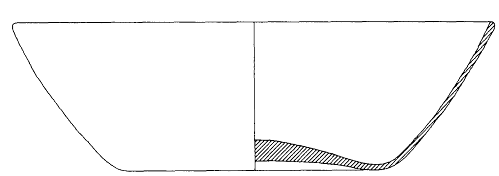


24. Bowl

Colorless, yellowish tinge
H. 5.8 cm; Diam. 19.2 cm
10th century
1939; Tepe Madraseh, Y6
Discarded

Fragment making possible a drawing. With a thick base.

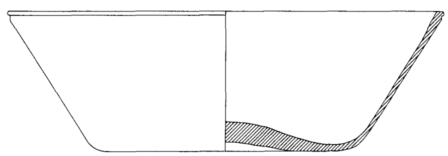
Compare the vessel in Lamm, *Glas von Samarra*, p. 16, fig. 4, no. 8.



25. Bowl

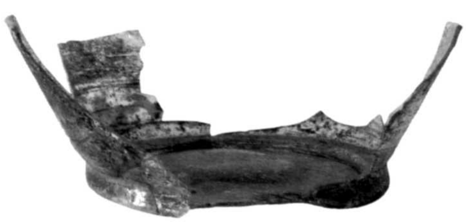
Colorless
H. 6 cm; Diam. 19.2 cm
10th century
1939; Tepe Madraseh, Y6
Discarded

Fragment making possible a drawing. Thick base; profiled, splayed rim.



26. Bowl

Colorless, pale yellowish tinge
H. 6 cm; Diam. 17.8 cm
10th century
1939; Tepe Madraseh, well in Y6, high level gatch
Discarded



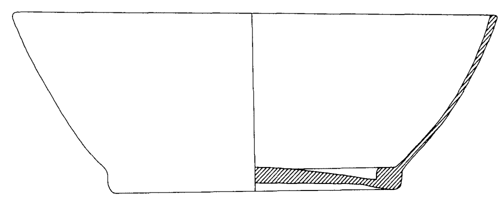
Two-thirds of wall missing. Wall folded on both sides to form a footring; kick-base, flaring wall with slightly profiled rim. On the inside, numerous horizontal grooves from tooling.

This way of folding the wall is characteristic for Nishapur finds. In Susa finds the wall is folded somewhat differently, forming a protruding horizontal rib between base and wall; see Kervran, "Niveaux islamiques," 1984, figs. 10, 15, 18 (bottles probably of the ninth century).

27. Part of a bowl

Colorless, greenish yellow tinge. Many bubbles. Corrosion; iridescence
H. 6.8 cm; Diam. (reconstructed) 18.8 cm; Th. at rim 0.15–0.25 cm
10th century
1939; Tepe Madraseh, Y6
MMA 48.101.281a–c

Several fragments, some joined. Two-thirds of wall missing. Thick base with shallow kick and rough pontil mark. Base folded on both sides as on Number 26; the folded wall compressed to make a thick footring. Wall flaring, rim slightly thickened. A number of grooves from tooling, mainly on the inner wall.



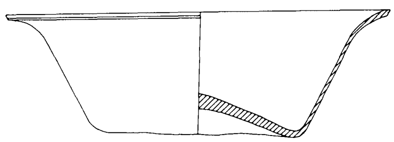


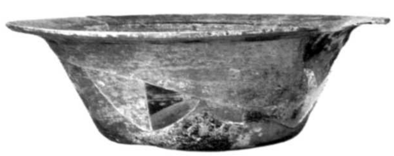
Bowls with an everted rim

Only three examples of this type were found, all from the well in Y6 in Tepe Madraseh. Number 28 is a small version; Numbers 29 and 30 are medium-sized bowls of similar dimensions. Bowls of this type have a thick base with a kick. The walls are quite thin and the rim curves out gently. The type has a ceramic counterpart (Wilkinson, *Nishapur: Pottery*, pp. 183–85, nos. 3–10).

28. Bowl

Colorless
H. 3.4–3.8 cm; Diam. 11.7 cm
10th century
1939; Tepe Madraseh, well in Y6, high level
Tehran, Iran Bastan Museum





Broken, mended; four pieces missing. Kick-base and flaring, somewhat irregular wall. Rim curving outward with wall folded(?) to inside or outside.

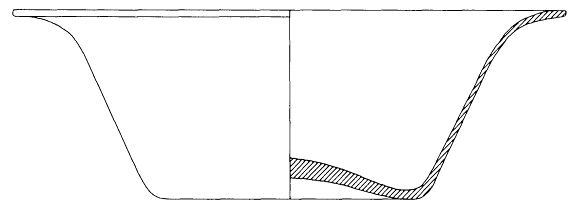
Shallow bowls with everted rims were common in Samarra (Lamm, *Glas von Samarra*, p. 16, fig. 2, no. 3). They are found with pinched decoration in Takht-i Sulaimān and Fusṭāṭ (see Pinder-Wilson and Scanlon, "Glass...Fustat: 1972–1980," fig. 10, no. 10, for an example of the ninth or tenth century).

---

29. Bowl

Blue
H. 5.9 cm; Diam. 17.9 cm
10th century
1939; Tepe Madraseh, well in Y6, high level gatch
Tehran, Iran Bastan Museum 8146

Broken, mended; parts of wall and rim missing. Of the same type as Number 28.





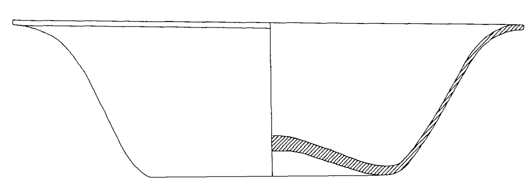
29

---

30. Bowl

Bluish green
H. 6.2 cm; Diam. 21 cm
10th century
1939; Tepe Madraseh, Y6
Discarded

Fragment making possible a drawing. Of the same type as Number 28.



Tripod bowls with an everted rim

Tripod bowls vary considerably from the other bowls. Only two examples of this special type were found, one in Sabz Pushan (No. 31) and the other in Tepe Madraseh (No. 32). They are both of colorless glass with a greenish tinge, but they differ in shape and size.

Number 31 seems to have been a very fragile vessel with an everted wall that was much too thin. Its tubelike handles, even though hollow, must have created a stress that weakened the whole construction. The three feet, worked separately and then affixed, resemble small bottles with conical necks, such as Number 82.

Only fragments were found of Number 32. On the basis of them the vessel was restored. The drawing gives a complete reconstruction, which the restored vessel matches except that it lacks an applied thread around the upper wall. A note accompanying the drawing states that the fragments on which the drawing was based were destroyed. It seems possible that there were finds of two very similar vessels.

Although glass tripod vessels are rare, a number of parallels do exist. It is not known what particular function these vessels served.

31. Tripod bowl

Colorless, green tinge
H. 8.5 cm; Diam.: base 8.5 cm, rim 16.8 cm
Feet: H. 3 cm. Handles: Diam. 4 cm, Th. 1 cm
9th–10th century
1937; Sabz Pushan
Tehran, Iran Bastan Museum 20316

Two-thirds of wall and one handle missing. The bowl, with a very slightly rounded base and thin flaring walls, rests on three attached, probably hollow feet consisting of small circular knobs with high conical necks. Attached to the lower part of the outer wall are two tubelike handles.

A fragment identical to one of the feet, of unknown purpose, was excavated in the Ctesiphon region; see Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, no. 779.



31

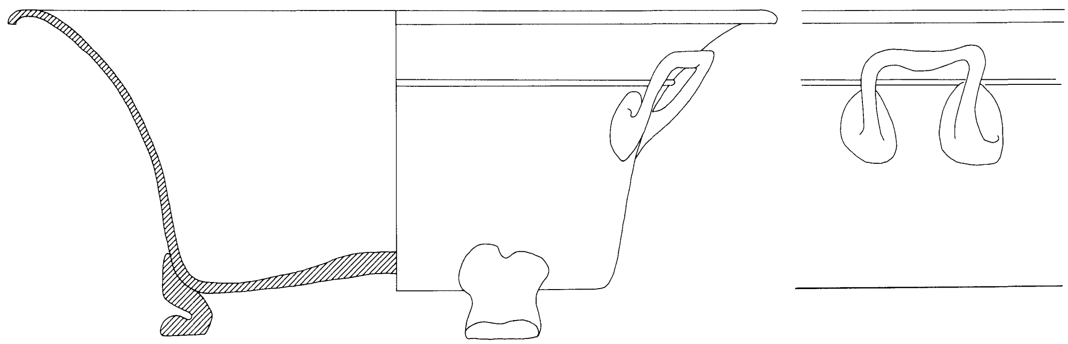
32. Tripod bowl

Greenish. Surface slightly dull; patches of blackish corrosion (now cleaned)
H. 7 cm; Diam. 24 cm
9th–10th century
1939; Tepe Madraseh, well in annex W4
MMA 48.101.56

Broken, mended; large missing pieces restored. Thick base with a shallow kick. Flaring walls and everted rim. Applied feet, probably three, of solid glass. Thin handles ending in globs of glass attached to upper part of wall beneath rim. An impressed line around upper part of wall; reconstruction drawing shows applied thread there (see discussion above).

The greenish tone and the quality of this glass are also to be found in Sasanian glass fragments, especially windowpanes from the unpublished excavations at Takht-i Sulaimān. This type of glass must come out of a Sasanian tradition.

An example with similar general features and similar dimensions was published as a Parthian bowl (*Kunstschätze aus Iran*, p. 53, no. 386). Its three feet and handles are treated differently. An example with a vertical wall and feet identical to those of Number 32 was probably used as a lamp; it dates from the eighth–ninth century (Jenkins, "Islamic Glass," no. 5). Tripod bowls with an everted rim are known in pottery from the excavations in Samarra (with handles: Sarre, *Keramik*, no. 130, pl. 10; without handles: *Excavations at Samarra*, pl. 58). See also finds from Susa, in Kervran, "Niveaux islamiques," 1977, figs. 35:1 (tenth century), 37:6. In Nishapur, shallow tripod bowls without handles were among the alkaline-glazed ware introduced in the late tenth century (Wilkinson, *Nishapur: Pottery*, pp. 261, 264, no. 6).





32

Bowls with an incurving rim

Only four vessels are of the type that has an incurving rim. Numbers 33 and 34, both from Sabz Pushan, have a well-defined base on which the bowl stands securely. The small bowl Number 33 is a finer object than the others because it is of dark blue glass and displays excellent workmanship. Pieces comparable to it are many; the vessel type seems to have been much employed in Islamic society. The bowls Numbers 35 and 36, both from the well in room Y6 of Tepe Madraseh, are similarly worked and have similar profiled rims. They do not stand securely because of their crude pontil marks and thus were probably not used to hold liquids.

33. Miniature bowl

Dark greenish blue. Extensive incrustation; iridescence
H. 2.7 cm; Diam. 4.7 cm; Th. at rim 0.4–0.5 cm
9th–10th century
1937; Sabz Pushan, 6F
MMA 38.40.197



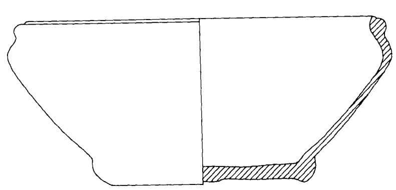
Complete. Flat footring-shaped base, shallow kick, pontil mark in center. Thick, flaring wall curving in toward the rim; rim flat on top. Vessel possibly mold blown. Ground and polished surface(?). On inside of base numerous scratches, perhaps marks of a modeling tool.

Most published vessels of comparable shape have a wall that tapers inward, then spreads into a broad rim, making the opening of the vessel small in diameter. See Saldern et al., *Gläser . . . Sammlung Erwin Oppenländer*, no. 709 (third–fourth century); Lamm, *Glas von Samarra*, p. 27, pl. 1, no. 101 (H. 4 cm; diam. 6 cm); Lamm, *Glass from Iran*, pl. 11:0 (ninth century). For a small piece from Syria with applied white combed and marvered threads, of twelfth-to-thirteenth-century date, see *Arts of Islam . . . Metropolitan Museum*, Berlin, no. 59.

---

34. Bowl

Greenish or colorless with black patina
H. 4.5 cm; Diam. 10.5 cm
10th–11th century
1935; Sabz Pushan, Old Tepe (north end of Sabz Pushan), *zir-i-zamin* in room 4
Discarded





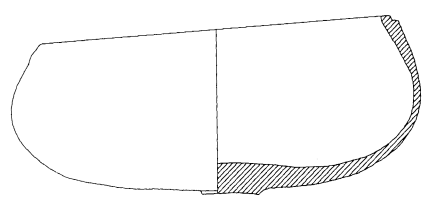
Broken, mended; some parts of wall missing. Thick, flat base with pontil mark; flaring wall, upper part tapering in; profiled rim. Numerous marks of a modeling tool.

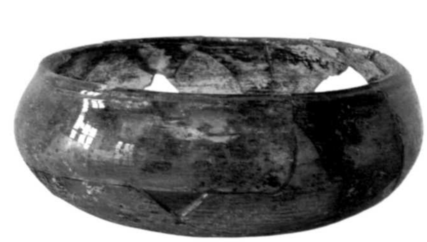
For a related bowl of the ninth–tenth century see Lane, "Medieval Finds," fig. 10P.

---

35. Bowl

Colorless, yellowish green tinge
H. 4.5–5.4 cm; Diam. 12.8 cm
10th century
1939; Tepe Madraseh, well in Y6, high level gatch
Tehran, Iran Bastan Museum



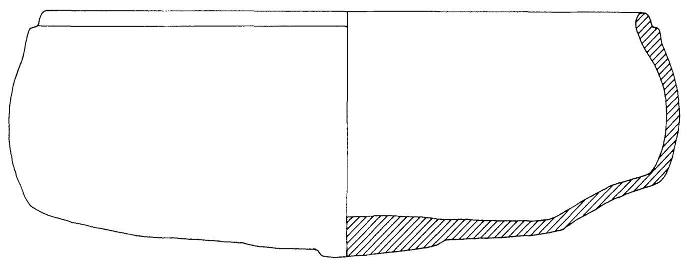


Broken, mended; parts of wall missing. Thick, flat base with crude pontil mark. Incurving wall of irregular height; profiled rim.

36. Bowl

Bluish green. Patchy corrosion; slight iridescence
H. 4.5–5.4 cm; Diam. 15.1 cm
10th century
1939; Tepe Madraseh, well in Y6
MMA 40.170.58

Broken, mended. Similar to Number 35. Thick, irregular base with crude pontil mark (diam. 2.2 cm) which prevents the bowl from standing evenly. Wall incurving, with profiled rim. On inside of wall, numerous grooves from tooling of the vessel.





BEAKERS, JARS, BOTTLES, AND JUGS

Beakers

The cylindrical (or near-cylindrical) beakers excavated at Nishapur can be divided into three types: the first with a ring on the interior of the base, the second with a kick-base, and the third with a flat base.

Two beakers from a well in room To in Tepe Madraseh, Numbers 37 and 38, are evidence that a type of beaker existed that had an interior ring. Number 39, a fragment of a larger beaker in Sabz Pushan, makes it clear that such pieces were in use in more than one Nishapur location. The interior ring, also found on large plates like Number 150, seems intended to give the vessel additional stability. This may be the case as well with bottles like Numbers 154 and 155, although a decorative purpose is evident too. This rather common feature is known from a number of vessels excavated in Iraq and in Egypt and seems datable to roughly the eighth to tenth century.[1] Since the structure of a vessel cannot be known with certainty unless it is nearly complete, there are probably finds that belonged to this type but have not been so classified.

Numbers 37 and 38 are of identical glass, and both have extremely thin walls; they may well come from the same workshop. But as Number 39 shows, thin walls are not a requirement for this type.

Only the beakers Numbers 40 and 41 belong to the second type, with a kick-base. They are from the same findspot in Sabz Pushan.

Twelve beakers or fragments thereof (Nos. 42–53) are of the type that has a flat base. Many are blown from a colorless glass of good quality. In these beakers the base is thick and usually quite flat; the wall is likewise thicker and stronger than those of the other beakers and is usually vertical and straight. Thus, these vessels stand out as having been made with particular care. The range of their dimensions is illustrated by the miniature beaker Number 42 and the exceptionally large (and well-worked) beaker Number 52. Possibly such a beaker was meant to go to the engraver's workshop to receive decoration. Decorated cylindrical beakers are found in Nishapur, either mold blown (No. 123), pinched (Nos. 135–140), or engraved in different ways (Nos. 199, 202). Frequently the height and diameter are nearly equal.

It is difficult to give a date to so simple a vessel shape as the cylindrical beaker. Although they were known, with mold-blown decoration, in late Roman times, it seems to be especially in the early Islamic period, from the seventh century onward, that these beakers satisfied a widespread need. The fact that beakers of a variety of types and sizes were found at Nishapur underlines their significance. It must also be kept in mind that this shape was one of those commonly used for lamps in the Islamic world, as the two examples from this excavation show (Nos. 232, 233). Sometime after A.D. 1000, cylindrical beakers disappeared.

1. Robert H. Brill of the Corning Museum of Glass has informed me that the interior ring also appears on two bowls from the Famen Temple crypt in China, which was sealed in A.D. 874; additionally, see his remarks in appendix 3.

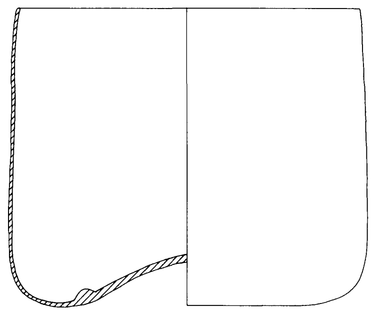
37. Beaker

Greenish with yellow tinge. Patchy corrosion; iridescence
H. 6.5 cm; Diam. 8.5–8.7 cm; Th. at rim 0.2 cm
9th century
1939; Tepe Madraseh, well in To, deep level/drain
MMA 40.170.179

Broken, mended; missing parts now restored. Walls irregular and slightly convex. Kick-base, pontil mark. On interior of base a thick ring, slightly off center.

For comparable beakers with an interior ring from Iraq, see Lamm, *Glas von Samarra*, pl. 2, no. 103; Negro Ponzi, "Islamic Glassware from Seleucia," fig. 54, nos. 103–4; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 712–14; Adams, "Tell Abū Sarīfa," fig. 15 (K 1, 2). This feature is now also known from the settlement on Bijān Island in the Euphrates, from

Raqqa in Syria, and from Takht-i Sulaimān in Iran. In addition, a beaker with an interior ring was found in the Famen Temple crypt in China and therefore antedates A.D. 874. A fine, though fragmented, bowl with pinched decoration was excavated in 1988 in the ʿAbbasid stratum of Pella (Jordan): see Edwards, "Preliminary Report," pp. 84–86, fig. 13:7, pl. 7: 1–2. Another decorated bowl, intact and from Egypt, is illustrated in Kröger, *Glas*, no. 106.



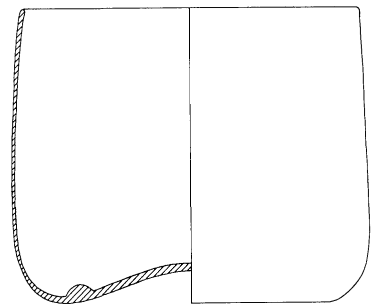


37

38. Beaker

Greenish with yellow tinge
H. 7.6 cm; Diam. 9.6 cm; Th. at rim 0.2 cm
9th century
1939; Tepe Madraseh, well in To, deep level/drain
Discarded

Broken, mended; a large part of wall missing. Walls slightly convex. Except for its larger size, virtually identical to Number 37.

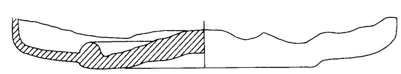




38

39. Fragment of a beaker

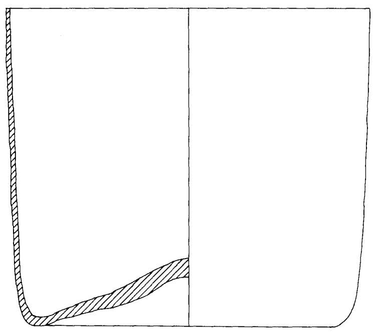
Green
H. 1.4 cm; L. 11.6 cm
9th century
1939; Sabz Pushan
Discarded



Base and short section of vertical wall. Base with interior ring, possibly belonging to a larger beaker of same type as Number 38.

40. Beaker

Green
H. 8 cm; Diam. 9.6 cm
9th–10th century
1939; Sabz Pushan, well in 9D
Discarded



Fragment making possible a drawing. Base with deep kick. Body very slightly flaring.

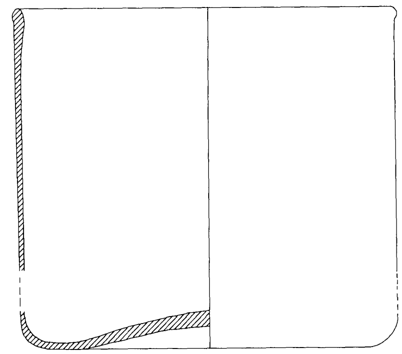
This beaker and Number 41, from the same findspot in Sabz Pushan, were of a lower-quality glass than the group that follows and had bases that were shaped differently.

41. Beaker

Greenish
H. 10.6 cm(?);[1] Diam. 12.4 cm
9th–10th century
1939; Sabz Pushan, well in 9D
Discarded

Fragment making possible a drawing. Kick-base.

1. A note that accompanied the drawing states that the height of this beaker is not known with certainty.



41

42. Miniature beaker

Colorless. Surface dull, patchy corrosion
H. 2.6 cm; Diam. 2.5 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh
MMA 40.170.57

Cracked but complete. Flat base with pontil mark, straight vertical wall, rounded (fire-polished?) rim.



43. Beaker

Greenish
H. 5 cm; Diam. 5 cm; Th. at rim 0.3 cm
9th–10th century
1937; Sabz Pushan, well in 9D
Tehran, Iran Bastan Museum 20377

Complete. A small beaker with a thick vertical wall.



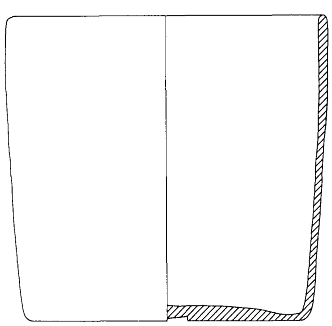
43

Broken, mended; part of wall missing. Thickened base with pontil mark.

For related beakers in Dwin, see Janpoladian, *Medieval Glassware*, pl. 39 and drawing, pl. 1:9. Beakers of this type were also found during the excavation of the foundation of a pagoda in China datable to A.D. 976; see An Jiayao, *Early Chinese Glassware*, p. 11, figs. 23, 24. It is noteworthy that one of the beakers was of blue glass.

44. Beaker

Colorless
H. 7.5 cm; Diam. 8 cm
9th–10th century
1939; Tepe Madraseh, latrine in T8, top level
Discarded





45. Beaker

Greenish with yellowish tinge. Patchy corrosion; iridescence (now cleaned)
H. 7.5 cm; Diam.: base 7.5 cm, rim 8 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh, latrine in T8, top level
MMA 40.170.66

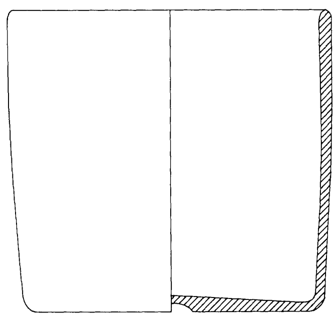


Broken, mended; missing parts now restored. Flat, thickened base, kick in center, pontil mark. Body an irregular cylinder with accidental(?) horizontal rib and slightly profiled rim. Vessel of very thin glass and thus extremely light.

46. Beaker

Glass color not recorded
H. 8 cm; Diam. 8 cm
9th–10th century
1939; Tepe Madraseh, latrine in T0
Discarded

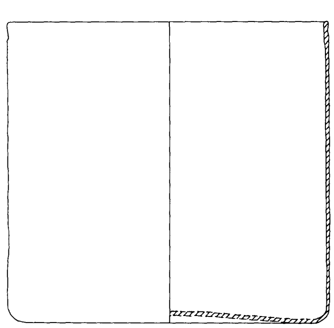
Fragment making possible a drawing. Of the same type as Number 45.



47. Beaker

Colorless
H. 8 cm; Diam. 8.9 cm
9th–10th century
1939(?); Sabz Pushan, well in B
Discarded

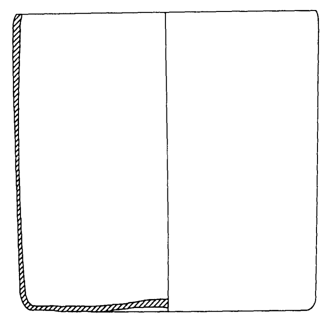
Fragment making possible a drawing. Of the same type as Numbers 44 and 45.



48. Beaker

Colorless
H. 9.2 cm; Diam. 10 cm
9th–10th century
1939(?); Tepe Madraseh, well in W0
Tehran, Iran Bastan Museum

Broken, mended; parts of vessel missing. Flat, thickened base with pontil mark. Very thin wall.



49. Beaker

Colorless. Completely corroded and iridized
H. 11.5 cm; Diam. 12 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh, well in X8
MMA 40.170.75

Broken, mended; but now in fragments. Parts of vessel missing. A large beaker. Flat base, kick in center, large pontil mark. Rim rounded, slightly thickened and flaring. Very thin wall.



50. Beaker

Colorless
H. 14.5 cm; Diam. 12.3 cm
10th century
1939(?); Tepe Madraseh, well in X8
Tehran, Iran Bastan Museum

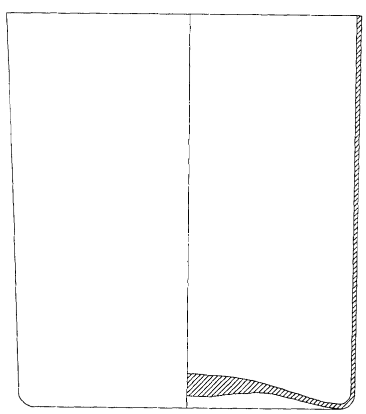
State of preservation not known. A large beaker of very thin glass.

---

51. Beaker

Colorless
H. 12.4 cm; Diam. 11.4 cm
10th century
1939(?); Tepe Madraseh, well in S7, just below top floor
Discarded

Fragment making possible a drawing. A large beaker. Flat, thickened base with kick.



---

52. Beaker

Colorless, slight yellowish tinge. Patchy weathering
H. 10.8–11 cm; Diam.: base 12.3 cm, rim 12.8 cm; Th. at rim 0.4–0.6 cm
9th century
1939; Tepe Madraseh, well in W0, deep level
MMA 40.170.74

Complete, but cracked. A large beaker. Flat base, slightly thickened center with kick, pontil mark. A well-worked piece.



52

---

53. Fragment of a vessel

Colorless. Iridescent
L. 5 cm; Th. 0.4–0.5 cm
9th–10th century
Excavation year and provenance unknown
MMA 48.101.290

Sherd from the base of a vessel, probably a beaker.

Jars

Undecorated jars were found in relatively small numbers at Nishapur. Those that do exist are either miniature vessels or large jars. The miniature jars are so small that not one of them has been recorded with an exact provenance. They are of colorless or greenish glass and have a globular shape (Nos. 54, 55), a globular body with a short neck (No. 56), or a tapering shape (No. 57). They display differences of both glass composition and workmanship. In quality of glass and fineness of manufacture, Number 55

stands apart. Number 54 has a somewhat irregular circular opening and a base that may be unfinished. Number 57 is a thick-walled vessel with a crude pontil mark.

How these tiny vessels were used is not known, but the existence of decorated counterparts as well (Nos. 174–176) makes it quite clear that miniature jars served some purpose in Islamic society.

The two large jars, Numbers 58 and 59, are very different in character. Number 58 has a relatively wide opening and a very short rim. Number 59, which has a thick, profiled rim, is a well-worked piece on which it is astonishing to find a crude pontil mark. Jars of both shapes were employed in all periods.

For a jar with an open rim see Lamm, "Verres . . . à Suse," pl. 75:2, opp. p. 358; also seen in Lamm, *Mittelalterliche Gläser* (pl. 2:12), which on pls. 3:24ff. illustrates a number of jars of different shapes. A much smaller jar was recently excavated in Egypt and dated to about A.D. 1000 (Pinder-Wilson and Scanlon, "Glass . . . Fustat: 1972–1980," fig. 4, no. 4). Jars in Tūrang Tepe without a profiled rim are dated to the eighth to ninth century (see Boucharlat and Lecomte, *Fouilles*, pl. 103:20–21).

54. Miniature jar

Colorless
H. 1 cm; Diam. 1.6 cm
9th–10th century
1939; provenance unknown
Discarded



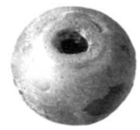
Complete. Globular body. On the rim, marks of tooling(?).

Simple jars like this one cannot be dated precisely. See Lamm, *Glass from Iran*, pl. 11 A–C (with dating of seventh–eighth century).

55. Miniature jar

Colorless
H. 1.5 cm; Diam. 1.8 cm
9th–10th century
1939; provenance unknown
Discarded

Complete. Undecorated globular body, slightly protruding rim.



56. Miniature jar

Colorless
H. 1.6 cm; Diam. 1.5 cm
9th–10th century
1939; provenance unknown
Discarded

Complete. Globular body, short cylindrical neck with a wide opening.



57. Miniature jar

Greenish. Corrosion
H. 1.5 cm; Diam. 1.3 cm; Th. at rim 0.2 cm
9th–10th century
1939; provenance unknown
MMA 40.170.450



57

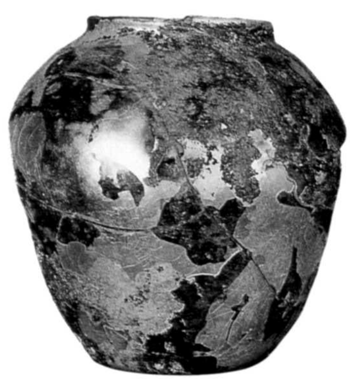
Complete. Rounded base with crude pontil mark, which prevents jar from standing evenly. Body tapers upward. Opening small (diam. 0.6 cm) because of wall's thickness.

---

58. Jar

Colorless, greenish tinge
H. 7.7 cm; Diam. 7.5 cm
9th century
1939; Tepe Madraseh, To, deep level drain
Discarded

Broken, mended. Flat base, ovoid body, short cylindrical rim.



---

59. Parts of a jar

Yellowish green. Patchy corrosion
H. 8.5–9 cm; Diam.: base 5.5 cm, shoulder 10 cm, rim 6.2 cm
10th century
1937; Sabz Pushan, *zir-i-zamin* in 1D
MMA 38.40.196



59

Broken, mended; most of wall missing, now restored. Thick base with crude pontil mark; irregular body tapers downward. Short cylindrical neck cut off and tooled around to the outside, creating a thick, profiled rim.

Miniature bottles

Vessels of this type are found in every excavation of early Islamic material. They were used without interruption from Sasanian times until at least the eleventh century.

In the Sasanian period, miniature bottles with a globular or cylindrical body and a cylindrical neck were worked with care. They have been excavated in large quantities in Iraq and Iran. The pattern continued in the Islamic period; the small bottles (approximately 4 cm high and 2–4 cm in diameter) were found in excavations in Iraq and Iran, including in Nishapur.

It is remarkable that in the Islamic period, carelessly worked bottles are found side by side with small bottles of excellent proportions. Compare, for example, Numbers 65 and 76, both from the same findspot. Carelessly worked bottles are hardly given a proper shape; many have an irregular body, and the pontil mark is usually crude. The rim is sometimes left just as it was knocked off the blowpipe (Nos. 61, 62, 65) or, usually, is just thickened; occasionally it is fashioned (Nos. 69, 70, 73). However, some bot-

tles are worked with care (e.g. Nos. 76–79, 82), and these are generally the ones made of better-quality glass.

Miniature bottles were found in nearly all the areas excavated, but for many of these vessels no exact findspot was named. Only the well in Room 1 A 1 in Qanāt Tepe seems to have yielded as many as three bottles.

In addition to colorless glass, all shades of light green and green with a yellowish tinge are common. The bottle shape can vary. A globular body may run directly into the neck (Nos. 65, 66) or can be set off from a cylindrical neck, as is frequently the case (Nos. 68, 71, 72, 76, 78). The body can be of a squat globular type (Nos. 73ff.). The neck, sometimes although rarely flaring (No. 77), can be short (Nos. 74, 77) or quite long (Nos. 82ff.) and can have a bulge near the rim (Nos. 85, 86). The diameter of the neck can also vary widely (compare Nos. 76 and 84). The bottles range in height from just 2.7 centimeters (No. 73) to almost 7 (No. 81); most are between 4 and 5 centimeters.

These small bottles, like the large bottles Numbers 93–95, may have been closed with a cotton stopper, or at any rate with some material that would not crack the fragile neck. Although the bottles were widely used, nothing is known of their contents. Were they filled with some sort of liquid, or was it a powder? Whatever they contained, they seem to have been a necessity in early Islamic society. It seems that nearly all the differences in form among the bottles are due to their mass production. Items of daily use, they were not made to last long. Nor were they suited for transport, being extremely thin. They were undoubtedly made locally to serve as cheap utilitarian wares.

60. Miniature bottle

Colorless
H. 3.8 cm; Diam. 2.2 cm
9th–10th century
1939; Tepe Madraseh, W 1
Tehran, Iran Bastan Museum 20304



60

Complete. Irregular body, short neck.

Many small bottles are treated in the literature. See, for Samarra: Lamm, *Glas von Samarra*, pp. 13, 22ff., pl. 2, no. 70; *Excavations at Samarra*, pls. 108–9. For the Ctesiphon area: Negro Ponzi, "Islamic Glassware," pp. 77–78, figs. 48, 49, nos. 13ff.; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 602–26 (for the Sasanian bottles see nos. 91–96); Abdul Khaliq, "Al-Mada'en," pp. 111–38, figs. pp. 118, 119, 131. For Susa: Kervran, "Niveaux islamiques," 1984, pp. 212–13, fig. 8, nos. 9–14; Hardy-Guilbert, "Niveaux islamiques," fig. 31, pl. 6:1, 2, 4. For Gurgān: Kiani, *Islamic City*, pp. 84–85, figs. 41, 44, 45.

---

61. Miniature bottle

Colorless
H. 4.2 cm; Diam. 2.6 cm
9th–10th century
1939; provenance unknown
Discarded



Cracked; probably parts of wall missing. Globular body leading to a cylindrical neck. Straight, cut-off rim. Crude pontil mark on base.

62. Miniature bottle

Colorless, greenish tinge
H. 4.2 cm; Diam. 2.5 cm
9th–10th century
1939; Tepe Madraseh, X13, second level
Tehran, Iran Bastan Museum 21417

Complete. Similar to Number 61.



63. Miniature bottle

Colorless, yellowish green tinge
H. 4 cm; Diam. 2.8 cm; Th. at rim 0.1–0.3 cm
9th–10th century
193?; provenance unknown
MMA 48.101.276

Broken; parts of wall missing. Similar to Number 61.

64. Fragments of a bottle

Greenish. Corrosion, iridescence
L. 2.3 cm, 1.7 cm
9th–10th century
193?; provenance unknown
MMA 48.101.288

Small fragments of a bottle similar to Number 61.

65. Miniature bottle

Colorless
H. 4.2 cm; Diam. 2.1 cm
9th–10th century
1938; Qanāt Tepe, well in 1A1
Tehran, Iran Bastan Museum



Complete. Irregular globular body curving into a cylindrical neck. Rim cut off crudely. Bottle leans to one side when standing.

66. Miniature bottle

Colorless
H. 4.2 cm; Diam. 2.7 cm
9th–10th century
1939; exact provenance unknown
Discarded

Complete when excavated but subsequently broken. Globular body, flaring neck.



67. Miniature bottle

Yellowish green. Many bubbles. Patchy corrosion
H. 4 cm; Diam. 3.4 cm; Th. at rim 0.2 cm
9th–10th century
1938; Sabz Pushan
MMA 38.40.241



Cracked but complete. Irregular globular body and pontil mark. Neck cut off crudely. Similar in type to Number 81.

68. Miniature bottle

Colorless
H. 4.3 cm; Diam. 3.2 cm
9th–10th century
1938; Qanāt Tepe
Discarded

Complete when excavated but subsequently broken in transit. Similar to Number 67.



69. Miniature bottle

Colorless
H. 4.7 cm; Diam. 3.7 cm
9th–10th century
1939; Tepe Madraseh, W20, middle level
Tehran, Iran Bastan Museum

Complete. Thick neck, rim cut off straight. Similar to Number 67.



70. Miniature bottle

Colorless
H. 4.7 cm; Diam. 3.5 cm
9th–10th century
1939; Tepe Madraseh, *zir-i-zamin* in S8
Tehran, Iran Bastan Museum

Complete. Irregular neck. Similar to Number 67.



71. Miniature bottle

Light green. Extensive blackish corrosion
H. 5 cm; Diam. 3.6 cm; Th. at rim 0.3 cm
9th–10th century
1939; Tepe Madraseh, S9 top
MMA 40.170.72



Small parts missing around rim. Flat base with pontil mark. Globular body and irregular cylindrical neck widened toward rim; rim unevenly thickened.

Compare the related bottle in Genito, *Vetri iranici*, p. 25, no. 526 (Susa[?], tenth century).

72. Small bottle

Colorless
H. 5.2 cm; Diam. 4.1 cm
9th–10th century
1938; Tepe Madraseh
Tehran, Iran Bastan Museum

Complete. Flat base; globular body and cylindrical neck.



73. Miniature bottle

Colorless
H. 2.7 cm; Diam. 1.6 cm
9th–10th century
1939; Tepe Madraseh
Tehran, Iran Bastan Museum 20358

Complete. Drumlike body and cylindrical neck. Folded wall creates a profiled rim.



74. Miniature bottle

Colorless
H. 3.5 cm; Diam. 3 cm
9th–10th century
1938; Tepe Madraseh
Tehran, Iran Bastan Museum

Complete. Short neck. Similar to Number 73.



75. Miniature bottle

Colorless
H. 3.7 cm; Diam. 3.4 cm
9th–10th century
1937; Village Tepe
Tehran, Iran Bastan Museum 20302

Complete. Irregularities on body and neck. Similar to Number 73.



76. Miniature bottle

Light green. Patchy incrustation
H. 3.9 cm; Diam. 3.5 cm
9th–10th century
1938; Qanāt Tepe, well in 1 A 1
MMA 39.40.129

Complete. Flat base with pontil mark. Similar to Numbers 72 and 73.



77. Miniature bottle

Light green. White corrosion; iridescence
H. 4.2 cm; Diam. 4.3 cm; Th. at rim 0.2 cm
9th–10th century
1938; Qanāt Tepe, well by East Kiln
MMA 39.40.131

Complete. Thickened kick-base with pontil mark. Body compressed, flaring neck. Similar to Number 75.



78. Miniature bottle

Colorless with greenish tinge. Corrosion; iridescence
H. 4.1 cm; Diam. 3.1 cm; Th. at rim 0.1–0.2 cm
9th–10th century
1947; at kilns
MMA 48.101.18

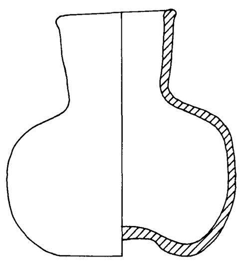
Complete. Globular body, cylindrical, slightly flaring neck.



79. Miniature bottle

Yellowish
H. 4.7 cm; Diam. 4.5 cm
9th–10th century
1939; Qanāt Tepe, well in 1 A 4
Discarded

Complete. Kick-base with pontil mark. Globular, somewhat irregular body. Slightly conical neck with thickened rim.



80. Three fragments of vessels

Colorless. Heavily iridized
Th. 0.1–0.2 cm
9th–10th century
Excavation date and location unknown
MMA 48.101.286 a–c

Fragments from small vessels.

81. Bottle

Light yellowish green. Many bubbles. Small patches of corrosion
H. 6.8 cm; Diam. 5 cm; Th. at rim 0.2 cm
9th–10th century
1938; Sabz Pushan, *zir-i-zamin* in 1 F 2
MMA 38.40.232



81

Cracked; piece near rim missing. Crude pontil mark in kick-base. Irregular globular body; cylindrical, slightly flaring neck.

82. Miniature bottle

Colorless, greenish tinge. Many bubbles. Patchy corrosion; iridescence
H. 4.3 cm; Diam. 2.7 cm; Th. at rim 0.1 cm
9th–10th century
1939; Tepe Madraseh, well by "maze" in S 4
MMA 40.170.63

Cracked; part of rim missing. Flaring body and long, slightly flaring neck (neck: H. 2.3 cm, diam. 1.6 cm). Thickened base with pontil mark.



83. Miniature bottle

Colorless(?). Almost entirely encrusted; iridescence
H. 4.9 cm; Diam. 3.4 cm
9th–10th century
1937; Sabz Pushan, 11G
MMA 38.40.231

Complete. Flat base with pontil mark. Long, slightly flaring neck.



84. Miniature bottle

Greenish, yellow tinge
H. 5 cm; Diam. 3.9 cm
9th–10th century
1937; provenance unknown
Tehran, Iran Bastan Museum

Complete. Long neck with widened rim.



85. Miniature bottle

Colorless
H. 4.5 cm; Diam. 3.6 cm
9th–10th century
1938; Qanāt Tepe
Tehran, Iran Bastan Museum

Complete. Globular body. Constricted neck with wide cylindrical rim.



86. Miniature bottle

Color not determinable. Heavily corroded
H. 4.9 cm; Diam.: body 3.9 cm, rim 2.1 cm; Th. at rim 0.15–0.2 cm
9th–10th century
1939; near Tepe Madraseh
MMA 40.170.65

Hole in side of wall. Globular body. Flat base with kick in center and pontil mark. Cylindrical neck, bulging at rim.



Two bottles of medium size

These bottles do not belong with the group of small bottles even though they are only slightly larger, nor do they fit into any of the other categories. The two bottles are equal in height but dissimilar in shape, although both have long necks. The neck of Number 87 has a bulge and a wide flaring rim, and that of Number 88 has a folded and flattened rim like those of bottles Numbers 89–92.

87. Bottle

Colorless, yellowish tinge
H. 8.5 cm; Diam. 4.7 cm
9th–10th century
1937; Sabz Pushan, IC, *zir-i-zamin*
Tehran, Iran Bastan Museum

Complete but cracked. Flattened globular body. Long neck with bulge and flaring rim.



---

88. Bottle

Glass color not known due to corrosion
H. 8.5 cm
9th–10th century
1938; Qanāt Tepe
Tehran, Iran Bastan Museum

Complete. Flat base, long cylindrical neck, rim folded over and flattened.



88

Bottles with a globular body

Two different types of bottles fall within this grouping. Numbers 89 and 90 have a globular body, a slightly flaring neck, and a flattened rim. They are from different findspots in Tepe Madraseh. Bottles with this type of neck and flattened rim seem to have had widespread use in the early Islamic period. Usually only the necks survive; the globular body was often extremely thin, as is well illustrated by Number 89. These bottles doubtless served everyday purposes and were not very expensive. It does not seem possible to give such vessels a precise date.

The same is true of the two very large bottles that follow—the largest vessels found in the excavations. They too are from Tepe Madraseh. The glass is dark green or green. The bottles are similar and could well come from one glasshouse. The bodies are essentially globular, and the necks, of unlike heights, have an unthickened sprung rim (that is, roughly knocked off from the blowpipe). A bulge at the shoulder is an accidental result of the way the body was fashioned. In the manufacture of purely utilitarian bottles such as these, no need was felt to take special care. Large bottles of the same kind are well known from other sites and seem to have served

a specific purpose. Quite often (although not on the Nishapur examples) the neck has a thick applied thread, which could have had a particular function. When Wilkinson published Number 92 in 1943, he suggested that bottles of this type were used for wine.

89. Bottle

Colorless, yellowish brown tinge. Many bubbles. Surface dull; patchy corrosion
H. 9.2 cm; Diam.: body 6.8 cm, neck 1.7–2.1 cm, rim 3.7 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh, from drain in W15, gatch level
MMA 40.170.56

Broken, mended; a hole in one side. Broken again in 1974 but now restored. Thin-walled globular body. Base with shallow kick. Crude pontil mark (diam. 1.2 cm) prevents bottle from standing securely. Flaring neck with a few grooves from tooling. Rim folded over 0.9 to 1 centimeter and flattened.

This type of undecorated bottle, with its characteristic neck and flattened rim, was extremely popular in Iraq and Iran during the early Islamic period. It is found in many sizes; usually only the neck remains. See Lamm, *Glas von Samarra*, fig. 9, no. 33, fig. 10, nos. 35, 36; *Excavations at Samarra*, pl. 112; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, no. 659; Lamm, *Glass from Iran*, pl. 9 K–L; Whitcomb, *Before the Roses*, pp. 154, 157, fig. 58z. Numerous fragments of similar bottles were found at Takht-i Sulaimān. The shape descends from that of Sasanian bottles, which were usually somewhat squatter and thicker-walled; see, e.g., Fukai, *Persian Glass*, pl. 34. A bottle of Sasanian type that was found in a Tang tomb in China has been given a seventh-century date; see An Jiayao, *Early Chinese Glassware*, pp. 7–8, fig. 12.

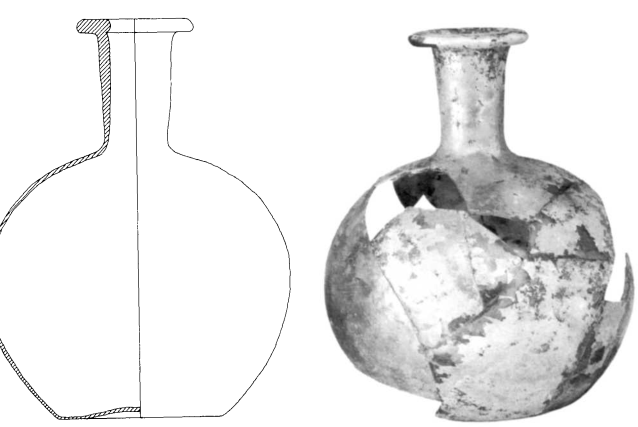
90. Bottle

Colorless
H. 15 cm; Diam. 12 cm
10th century
1939; Tepe Madraseh, well in X8, middle level
Discarded

Broken, mended; one-third of wall missing. Globular body, flattened base, slightly flaring neck. Rim folded and flattened.



89



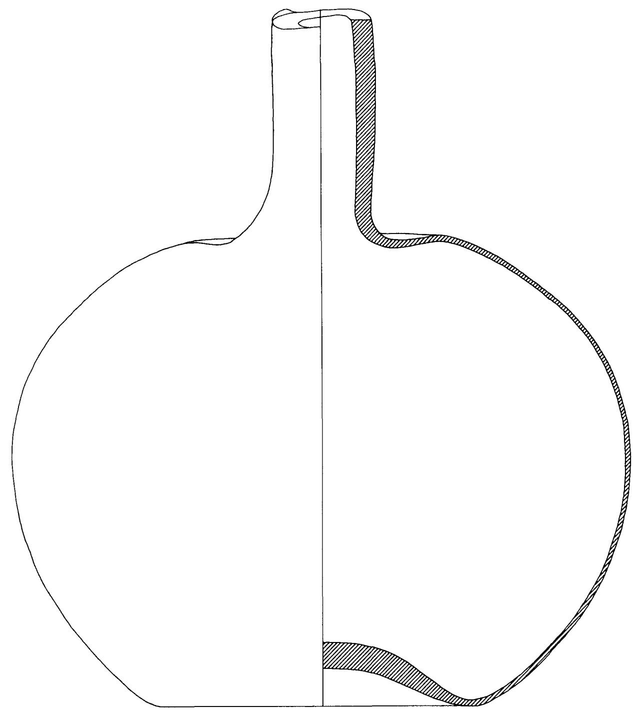
90

91. Bottle

Colorless, greenish tinge
H. 24 cm; Diam. 24.5 cm; Th. at rim 0.8 cm
9th–10th century
1939; Tepe Madraseh
Discarded

Broken, mended; probably more than one-third missing. Large bottle with a globular body. Flattened base, kick in center with crude pontil mark. Slight bulge at the shoulder; short cylindrical neck, roughly cut off.

Large bottles of various shapes, some related to this shape, have been found at nearly all the sites containing early Islamic material. Sometimes the rim of the neck is fire-polished, and sometimes there is a collar ring around the neck. The sizes vary considerably. See examples in Lamm, *Glas von Samarra*, pl. 2, no. 111 (probably not as large), and *Excavations at Samarra*, pl. 113:1, 2. For a discussion of this type, see Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 912–18.



92. Bottle

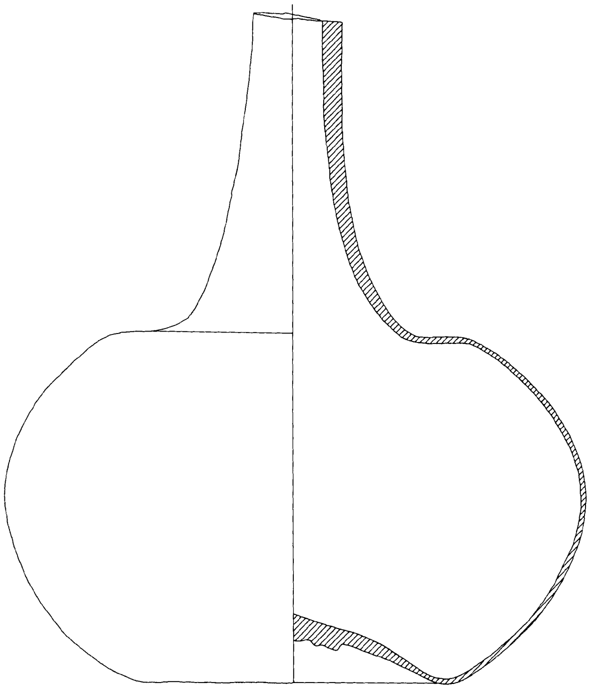
Dark green or green
H. 34.6 cm; Diam. 31.4 cm; Th. at rim 1 cm
9th–10th century
1939; Tepe Madraseh, X14
Discarded

Broken, mended; pieces of body missing. Large bottle with flattened globular body. Base flattened; kick with crude pontil mark. A slight bulge at shoulder and a tapering neck, roughly cut off.

Reference: Wilkinson, "Water," p. 176.



91





92

Bottles with an elongated, flattened body

Found all over Nishapur were thousands of very thin fragments of blue or colorless glass that the excavators recognized as belonging to a type of bottle that usually has a rounded base, a long, barrel-shaped, irregular body, usually flattened just above the base on one side, and a cylindrical, tubelike neck with an unthickened, sprung rim. The dimensions of these bottles vary within a certain range, the height averaging around 20 centimeters and the greatest width between 3.5 and 4.5 centimeters. The bottle is usually blown out paper thin and thus cracks easily. It cannot stand on its base but must be laid on its partially flattened side. Vessels of this type are not carefully manufactured. They appear to be mass-produced bottles, cheap but obviously of importance for their users. Although they existed in Iran and Iraq in great numbers, we have no idea of their purpose.

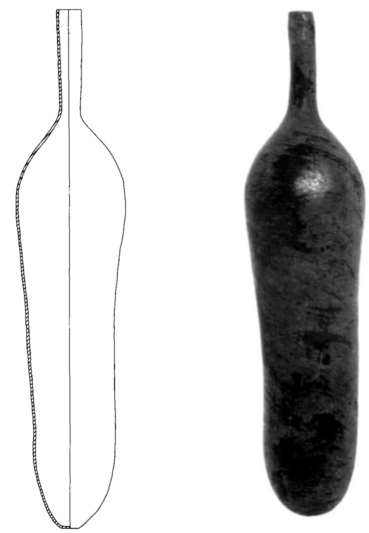
Sherds of this type of bottle were found in Tepe Madraseh, Sabz Pushan, Qanāt Tepe, and Village Tepe, according to a note on the original drawing for Number 93. This is the only kind of glass object that was found in nearly every area where the Nishapur expedition worked.

A number of bottles of this type have been published, some said to be from Nishapur. All show the same characteristics, and it seems likely that such vessels were manufactured throughout the Near East. Fragmentary bottles excavated in Samarra and the Ctesiphon region probably served the same purpose. These differ somewhat in their proportions but have similar tubelike necks that were closed with a cotton stopper. The bottle neck was then wrapped in a long strip of papyrus, fastened by a cotton string. Perhaps the Nishapur bottles were closed in the same way.

Only one example was found of a second type of bottle with a flattened body (No. 96). More carefully shaped, it is elliptical in cross section and tapers downward; there is a long neck. The fragment of a similar bottle from Samarra and some examples from other sites suggest that this was a widespread type.

93. Bottle

Greenish blue. Corroded; iridescent
H. 19.7 cm; Diam. 4.3 cm
9th–10th century
1939; Tepe Madraseh, well in X14, low level
MMA 40.170.70



Complete. Long, barrel-shaped, slightly tapering body, nearly straight on one side. Glass very thin. Pontil mark on base. Short cylindrical neck, chipped at rim.

Reference: An Jiayao, *Early Chinese Glassware*, p. 11, fig. 22.

For a list of comparable bottles see Saldern, *Glas . . . Sammlung Hans Cohn*, no. 191. Because the bottles are always blown out thin, usually only the short cylindrical necks remain; see examples in Lamm, *Glas von Samarra*, p. 27, no. 105, and Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, no. 655. Saldern draws attention to the fact that Byzantine bottles with gilt decoration are related in shape (see, e.g., *Glass . . . Smith Collection*, no. 526; on the Byzantine bottles, mostly found in Cyprus, see Megaw, "More Gilt . . . Glass"). Those are of a very different nature, being carefully worked and painted, and seem unconnected to the early Islamic examples, which in any case are not all of the same shape. Nevertheless, the Islamic and Byzantine bottles may have served similar purposes. An Jiayao recently published a bottle with an ovoid body and a spiral pattern, datable to A.D. 976, which she relates to this bottle type (*Early Chinese Glassware*, p. 11, fig. 21).

---

94. Bottle

Color and dimensions unknown
9th–10th century
1939; Tepe Madraseh, drain in W20
Discarded

Complete. Similar to Number 93.

---

95. Bottle

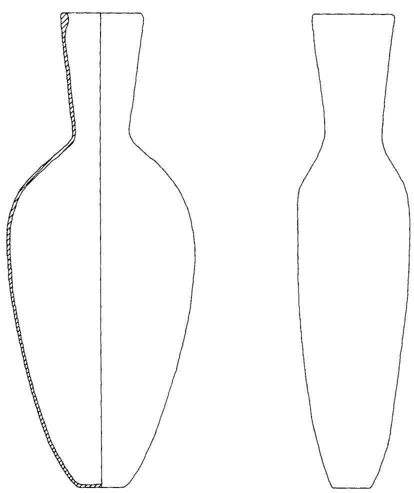
Colorless
H. 22.5 cm; Diam. 3.7 cm
9th–10th century
1939; Tepe Madraseh, T6
Discarded

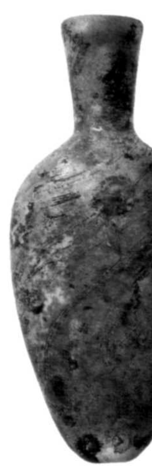
Complete. Similar to Number 93 but slightly larger.



96. Bottle

Colorless, greenish tinge
H. 14 cm; Diam. 5.8 cm
10th century
1939; Tepe Madraseh, well in X2 (on drawing written X3), second level
Tehran, Iran Bastan Museum





Complete. Flattened, tapering body and long, slightly flaring neck. Base flattened, possibly with pontil mark. Rim thickened by folding to the inside(?).

For a comparable piece see Lamm, *Glas von Samarra*, pl. 3, top center (erroneously labeled no. 144). See Billeter, *Glas*, p. 43, and Kröger, *Glas*, no. 25, for larger examples of the type, both from Iran. For examples excavated in Dwin, see Janpoladian, *Medieval Glassware*, pls. 108–9 (H. 17 and 20 cm). For a larger bottle with a flattened body from Samarra see *Excavations at Samarra*, pl. 107 (H. 25 cm; diam. 16 cm). For variously shaped, larger bottles with flattened bodies from an Īl-Khānīd stratum of the excavations at Takht-i Sulaimān, see *Islamische Kunst: Verborgene Schätze*, no. 203 (twelfth–fourteenth century). In Athens there is a well-known example, a slightly larger bottle (H. 17.8 cm) similar in shape to Number 96, with wheel-cut decoration in the slant-cut style; see Figure 14, p. 162.

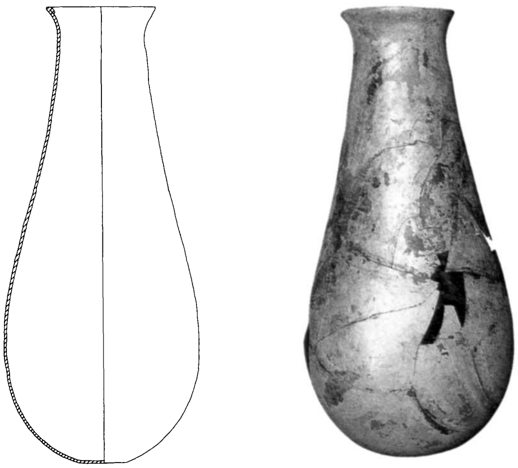
The variety of comparable examples suggests that this was a widespread type of vessel. The flattened shape may have been devised to facilitate the shipment of bottles containing liquids. It is an open question whether this type of bottle reflects the influence of late Roman pilgrim bottles such as the one in Platz-Horster, *Antike Gläser*, no. 93.

Neckless bottle

This bottle is of a type in which no distinction can be made between body and neck. The bottle tapers from its bottom virtually to its top. It is of modest size, and the glass is described as very thin. In shape it resembles pyriform vessels of the Sasanian period, which usually are larger and have wheel-cut facets. Perhaps this bottle had a function connected with distillation. The shape was certainly devised for some special purpose, but one unknown to us.

97. Bottle

Colorless; glass very thin
H. 16 cm; Diam.: body 7 cm; rim 4 cm
10th century
1939; Tepe Madraseh, well in S8, *zir-i-zamin*
Tehran, Iran Bastan Museum



97

Broken, mended; some pieces missing. Tapering bottle; short, profiled rim.

Sasanian vases (H. ca. 20 cm) of related pyriform shape, with cut facets, usually have a hole pierced through the center of the base. Their purpose is not known. See Fukai, *Persian Glass*, pl. 30; Hasson, *Early Islamic Glass*, p. 28, no. 49; Charleston, *Masterpieces*, pl. 24. Vessels that were used for distillation with an alembic usually have a pronounced collar that enabled them to fit into one another; a complete apparatus is in the Science Museum in London (inv. nos. 1978-219, 220; Anderson, "Early Islamic Chemical Glass"). There can be little doubt that this bottle was shaped to perform a special task. A user could take it in one hand near the rim and easily pour its contents into a second vessel. A vessel of related type but with a handle is also known; see Saldern, *Glassammlung Hentrich*, nos. 399, 400.

Square bottles

Just two square bottles were found at Nishapur. Both are small and blown from colorless glass. Possibly because of their small size, no exact findspot was recorded. Should one assume that such bottles were not much used by the inhabitants of Nishapur? No, because small square bottles of varying qualities of glass and of diverse manufacture had widespread popularity throughout the early Islamic period.

98. Miniature bottle

Colorless with yellowish tinge. Extensive corrosion and iridescence
H. 3.6 cm; Diam. 1.8 cm; Th. at rim 0.3 cm
9th–10th century
1937; provenance unknown
MMA 38.40.230

Square body. Flat base, chipped, with pontil mark. Short cylindrical neck, ground at top.

For a selection of comparative material see Lamm, *Glas von Samarra*, p. 13 and pls. 2, 3, nos. 75ff.; *Excavations at Samarra*, pl. 110; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 646–53; Lamm, *Glass from Iran*, pl. 11:G, K.



---

99. Miniature bottle

Colorless
H. 4.7 cm; Diam. 1.5 cm
9th–10th century
1937; Village Tepe
Tehran, Iran Bastan Museum

Complete. Square body. Short cylindrical neck.



Cylindrical bottles

The four cylindrical bottles found at Nishapur fall into two groups. Numbers 100 and 101 are similar bottles with thick walls. They may have been free-blown and tooled, but they might also have been mold blown. The glass is especially thick at the bottom. In both cases the glass is of high quality.

Numbers 102 and 103 belong to a type of bottle that has a short cylindrical neck. The shape of Number 103 might stem from that of a large jar. In its glass quality Number 102 recalls the simple bottles such as Number 78.

100. Miniature bottle

Light green. Patchy corrosion; iridescence
H. 3.8 cm; Diam. 3.3 cm; Th.: rim 0.2 cm, base 0.5–0.7 cm
9th–10th century
1936; purchase
MMA 37.40.8

Body cylindrical with thick, flattened base, pontil mark in the center. Neck cylindrical and slightly flaring.



101. Bottle

Colorless, yellowish green tinge. Patchy corrosion; iridescence
H. 7.6 cm; Diam.: base 6 cm, neck 3.5 cm; Th.: rim 0.3 cm, base 1 cm
9th–10th century
1939; Tepe Madraseh, well in To, deep level
MMA 40.170.73



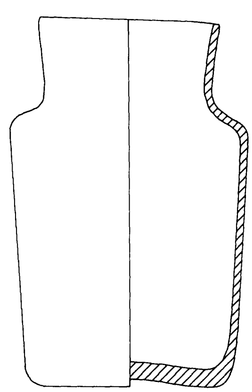
101

Broken, mended; several pieces missing and now restored. Cylindrical body. Thick, flattened base with shallow kick, pontil mark in center (diam. 1.2 cm). Short cylindrical neck.

102. Bottle

Colorless. Heavy black corrosion; iridescence
H. 6.3 cm; Diam.: body 4.1 cm, neck 3.2 cm; Th. at rim 0.15 cm
9th–10th century
1939; Tepe Madraseh, south(?) edge, lower level
MMA 40.170.71

Complete. Small, irregular cylindrical body. Kick-base with small, circular pontil mark. Short cylindrical neck.

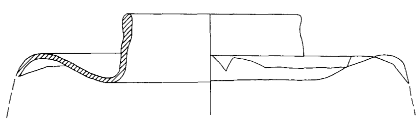




103. Fragment of a bottle(?)

Greenish
H. 3 cm; Diam. 13.7 cm
9th–10th century
1939; Sabz Pushan, well in 9D
Discarded

Uppermost part of a vessel with a short cylindrical neck.



Tapering bottles

The tapering bottles can be divided into groups of small, medium-sized, and large types. The small bottles Numbers 104 and 105 belong to the category of vessel known as mold blown. However, Number 104 was both blown and tooled; its manufacture was obviously difficult and not quite successful, since many irregularities remain. Perhaps it and Number 105 were cheaper imitations of cut or engraved bottles. Number 105 may also have been blown into a mold and then tooled. Its shape is familiar from many examples all over the Islamic world. The short neck with its irregular grooves reminds one of cut glass pieces.

Number 106 is a rather small example of a type that generally carries engraved (that is, elaborately cut) decoration and is widely found in Iran. It was blown with care and perhaps was intended to go next to the engravers' department. It is astonishing that this bottle is the only example of its type found in the Nishapur excavations, since many similar bottles, usually dated to the ninth or tenth century on the basis of their engraving, are known. They exhibit facets and a variety of other designs. The fine quality of the glass of Number 106 and its high level of workmanship suggest that the bottle was something special in its time.

The same cannot be said of Number 107, a slightly larger bottle thickly blown from yellowish green glass. Its many marks from tooling and the irregularities of its flattened rim make it likely that this was a bottle for purely utilitarian purposes. If not destroyed by accident, a thick glass vessel such as this one could lead a long life.

The large bottles Numbers 108 and 109, blown of colorless glass, and the fragment Number 110 are of a well-known and extremely popular type in which the bottle's flaring body is surmounted by a long neck with a flattened rim. The same shape is seen on bottles with mold-blown decoration (Nos. 133, 134) and with different kinds of engraved decoration (Nos. 171, 172, 227).

The two undecorated bottles show different traits of manufacture. The smaller one, Number 108, is blown out quite thin and has a base with a shallow kick; the slanting wall of its body bends inward, and there is an irregularity on the shoulder. The rim is described as folded over, producing what the drawing shows as a little vertical wall. This rising edge would make it very difficult to pour out a liquid, and one wonders what the purpose of the feature was. The larger Number 109, which is the largest of its kind among the finds, appears regular in all respects, although its pontil mark might have prevented its standing evenly, and the rim seems to be of irregular thickness. These bottles may have been ordered without decoration; but another possibility is that they were deemed imperfect and unsuitable for further treatment, that is, cutting or engraving.

104. Bottle

Light green. Iridescence
H. 5.8 cm; Diam. 2.8 cm; Th. at rim 0.3 cm
9th–10th century
1937; purchase
MMA 38.40.297

Complete. A small bottle, possibly first blown into a mold and then tooled by hand. Numerous irregularities. A thick glob of extra glass on foot and body. Base a small, solid knob; flaring body wall surmounted by a ring; cylindrical neck.

A similar bottle in the Seattle Art Museum in Washington is slightly taller and has molded ribs; see "Recent Important Acquisitions," 1968, p. 183, no. 19.



104

For a related mold-blown bottle see Lamm, *Glass from Iran*, pl. 18 F. For a molar flask with an identical neck that was first blown and then wheel cut see Sugiyama, *Ancient Glass*, no. 216.

---

105. Bottle

Colorless, yellowish green tinge. Patchy corrosion; iridescence
H. 7.5 cm; Diam. 2.6 cm; Th. at rim 0.4 cm
9th–10th century
1938; Tepe Madraseh, D 1
MMA 39.40.126



Complete but cracked. Small bottle, thickened, tapering body with crude pontil mark at base. Neck almost cylindrical, with four slightly irregular horizontal grooves. Interior chamber ends well above the base. Either free-blown and tooled, or blown into a mold and tooled.

---

106. Bottle

Colorless, yellowish tinge. Iridescence
H. 9.7 cm; Diam. 6.3 cm; Th. at rim 0.5 cm
10th century
1937; Village Tepe
MMA 38.40.259

Broken, mended. Small bottle with flat base, shallow kick in center with part of a pontil mark. Bell-shaped body, flaring neck.

Surprisingly, this is the only example from Nishapur of a bell-shaped bottle, a type that usually carried wheel-cut decoration and was extremely popular from the ninth to the early eleventh century (Lamm, *Glas von Samarra*, fig. 9, no. 33; see also Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, no. 958). Pieces of similar shape are in numerous collections: see Lamm, *Glass from Iran*, pl. 16 L; Saldern, "Sassanidische . . . Gläser," pp. 53–54, fig. 12; Kröger, *Glas*, no. 191. This bottle's thick wall and high-quality glass suggest that it was meant to go on to the wheel-cutting department after being blown in a Nishapur glasshouse. Perhaps that chain of events was disrupted by the appearance of the prominent crack, caused by tension within the material.

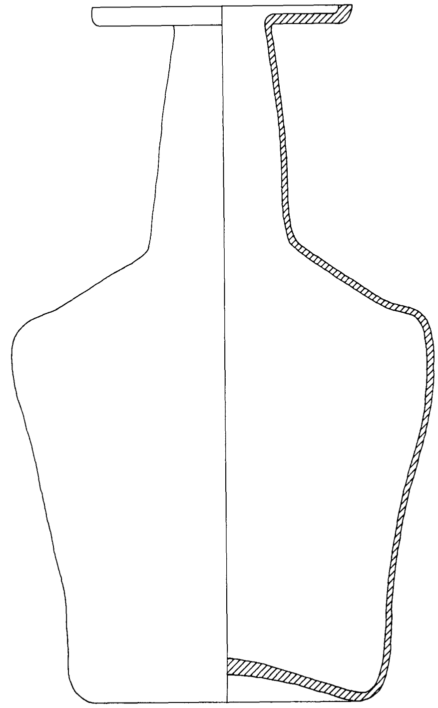
This bottle type may have been influenced by the shape of some metal vessels, or vice versa. A metal vessel so shaped was found in a deeper level in room 4 A 1 in Qanāt Tepe; see Allan, *Nishapur: Metalwork of . . . Islamic Period*, no. 90.



107. Bottle

Yellowish green. Thickly encrusted; patch of iridescence
H. 13 cm; Diam. 6.7 cm; Th. at rim 0.8 cm
9th–10th century
1936; Village Tepe, place 15–16
MMA 37.40.28





Broken, mended; chipped on the neck. Thick-walled, irregular, tapering body. Short, thick base ring created by a pontil mark with a diameter of 2.3 centimeters in the kick. Short, tapering neck with a crude flattened rim. Numerous marks of tooling.

A very similar but somewhat more distorted bottle was acquired in Nishapur before 1913 by Oskar von Niedermayer and is now in the Staatliches Museum für Völkerkunde in Munich (inv. no. 13-12-92). For other examples see Saldern, *Glassammlung Hentrich*, nos. 372ff., and Genito, *Vetri iranici*, inv. no. 131.

---

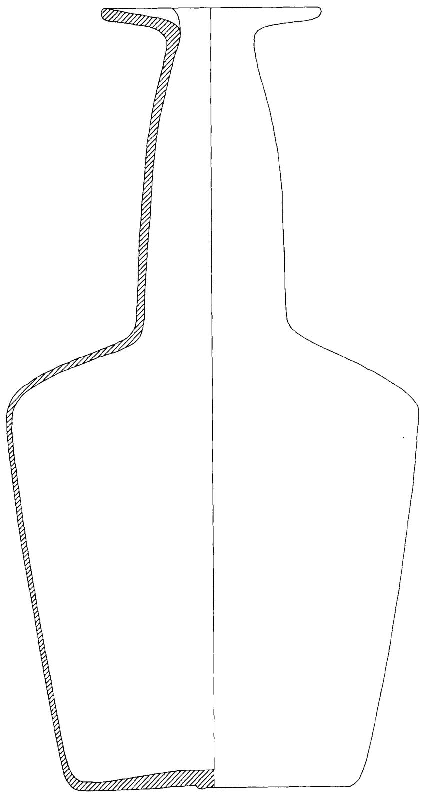
108. Bottle

Colorless
H. 16 cm; Diam. 10.4 cm; Th. at rim 0.3 cm
9th–10th century
1947; Tepe Madraseh, X21, deep level, pit A, by large wall
Discarded

Broken, mended; some pieces missing. Wall blown very thin. Thickened, pushed-up base, tapering body and neck. Flattened rim probably folded over.



108



109. Bottle

Colorless
H. 25.5 cm; Diam. 13.6 cm; Th. at rim 0.4 cm
9th–10th century
1939; Tepe Madraseh, well in T1, below top level
Tehran, Iran Bastan Museum 20325

Broken, mended; many fragments missing. Flat base, conical body and neck. Flattened rim.

---

110. Parts of a bottle

Yellowish green. Blackish corrosion
H. of body 6.2 cm; Diam. 7.5 cm
9th–10th century
1939; provenance unknown
MMA 48.101.58

Broken, mended; many missing pieces; body now restored. Kick-base, small pontil mark (diam. 1.1 cm). Body slightly flaring. Bottle may be of the same type as Number 109.



109

Jugs

Only a small fragment remains of a colorless jug, Number 111, that had a tapering neck, a spout at the orifice, and an applied handle. The entire vessel may have been quite large. The jug type is known from examples in Samarra and elsewhere; ultimately it goes back as far as the glass ewer preserved in the Shōsō-in shrine in Nara, Japan. The shape is best represented by a large jug with applied decoration from Qanāt Tepe, Number 160, whose handle is similarly folded beneath the flaring wall of the orifice.

While it is clear that Number 112 is a jug or pitcher because of the handle, one cannot be quite certain with Number 113; no handle was found among its fragments. Both vessels are from the same drain in a room in Tepe Madraseh

and therefore they should be considered together. Despite differences in glass composition and shape, the two pieces may well have been blown in the same glasshouse. A handle might have been intended but not executed for Number 113, since handles were added later; this is demonstrated by Number 112, on which the added handle is made of glass of a slightly different color. It is also true, however, that the flaring neck of Number 112 seems better suited to a jug than the cylindrical neck of Number 113. Thus the two vessels, similar in shape and dimensions, may have a few significant differences.

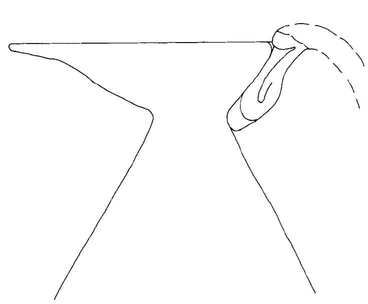
Vessels of the type of Number 112 were not found in decorated examples. Perhaps that is merely accidental, but perhaps there were some distinctions between the shapes used for plain and for decorated glass.

111. Top of a jug

Colorless
H. 7 cm; L. of spout 7.5 cm
9th–10th century
1939; Village Tepe
Discarded

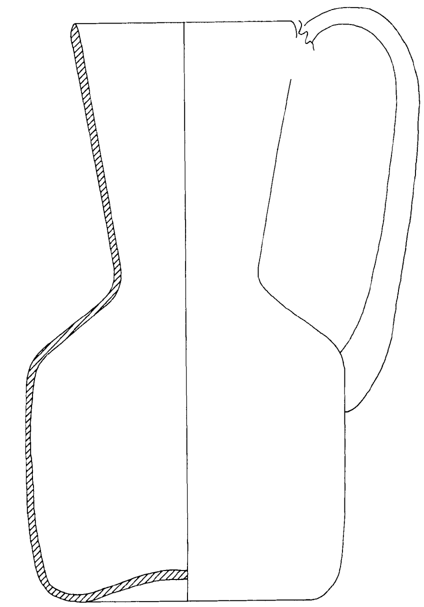
Uppermost part of a jug with tapering neck and flaring orifice with pointed spout. Part of applied handle remained folded beneath orifice wall.

For this type, compare Rosen-Ayalon, *Poterie*, p. 25, n. 1 and fig. 17, pl. 6e. See also Lamm, *Glass from Iran*, pl. 13B, D; Keene and Qaddumi, *Selected Recent Acquisitions*, no. 30 (ewer with ribs).



112. Jug

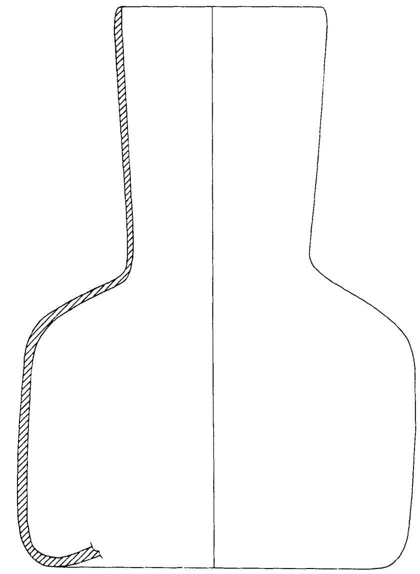
Green. Patchy corrosion; iridescence (now cleaned)
H. 15 cm; Diam. 8.4 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh, drain in T o, deep level
MMA 40.170.62





Broken, mended; pieces of neck and handle missing, now restored. Cylindrical body. Flat base with kick, pontil mark. Flaring neck. Applied handle attached to body and rim of neck.

For a somewhat more broadly proportioned ewer from Dwin, see Janpoladian, *Medieval Glassware*, pls. 99, 15:5 (H. 13 cm).



113. Jug

Greenish
H. 14 cm; Diam. 10.2 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh, drain in T o, deep level
Tehran, Iran Bastan Museum

Broken, mended; handle and pieces of body and neck missing. Probably a jug, although no handle extant. Similar in shape to Number 112, but not identical; no doubt from the same workshop.



113

Mold-Blown Vessels

The technique of blowing glass into a patterned mold arose soon after the invention of glass-blowing itself (about the middle of the first century B.C.) and was known in Iran beginning in late Parthian times. It was employed extensively by the Sasanians and continued to be a useful glass-decorating technique, although only one of many, during the Islamic period.

With this technique, the glass parison was first blown into a patterned mold and then removed to be worked further by blowing, tooling, and twisting. The result was a vessel that did not entirely match the original mold. A one-piece mold roughly like a bowl or beaker might be used to shape the body of the vessel; or an entire vessel might be shaped in a complex mold of two or more parts. Most Nishapur examples were blown in a single mold (Nos. 114–130). A few bottles (Nos. 131–134) show the use of two-part molds, which seem to have been employed only for executing more complicated designs.

The existence of many examples with very conspicuous joints, among them objects from Nishapur, demonstrates that the technique's major difficulty was the joining of the mold's two halves. It seems, however, that the Persian glass-worker was not much concerned with an exact fitting of the mold. Charles Wilkinson wrote of "the nonchalance of Persian potters," who made no attempt to disguise the joining of a vessel's separately molded handle and spout (Wilkinson, "Kilns," p. 239). Something similar can be said about glassmakers. For instance, the continuity of a decorative frieze on a molded vessel is usually interrupted by the joint.

In the Nishapur excavations only a little over twenty vessels and fragments of molded glass were recorded. However, since fragments of vessel types for which better examples existed were often discarded, it is impossible to know the total number of finds. Mold-blown glass was found mostly in Tepe Madraseh and Sabz Pushan, although some finds came from Village Tepe, Qanāt Tepe, and the site K I, which was abandoned after a trial trench.

Mold-blown glass occurs in all shades from light green to green and in all variants of yellowish green. Unusually, dark blue glass is used for the bottles Numbers 133 and 134. Colorless glass, seen in some undecorated vessels and quite typical for cut and engraved vessels, is not the material of any of the molded vessels unearthed.

Mold-blown decoration appears on a limited number of small bowls, beakers, and especially, small and middle-sized bottles. The finds display several types of patterns and can best be divided according to these. Vertical ribs or fluting (Nos. 114–117), sunken dots (Nos. 118–119), and a grid of crossing lines (Nos. 120–122) were the most widely used patterns.

Fluted decoration appears on vessels Numbers 114–117. Number 114 is a cylindrical bowl blown from thick greenish glass with broad vertical ribs that end well below the rim. This type of simple pattern was very common in Iraq and Iran from the late Sasanian period onward. The ribs, usually quite thick and either vertical or diagonal, decorate small or medium-sized bowls and sometimes beakers (Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 118–39; Lamm, *Glass from Iran*, pl. 18B and see pl. 18G; Janpoladian, *Medieval Glassware*, nos. 12, 62–66). Many such fragments are also known from Takht-i Sulaimān; see, for example, Naumann, *Takht-i Suleiman*, pl. 2, nos. 64, 66. The small bottles Numbers 115–117 display flutes that are more or less pronounced.

Numbers 116 and 117 have, additionally, a bulge at the neck, a feature also seen on the undecorated bottle Number 87 and on bottles with an interior ring (Nos. 154, 155) or applied threads (Nos. 156, 157) and very common in the Islamic world (see Janpoladian, *Medieval Glassware*, pls. 15:12, 122).

The vessels Numbers 118–122, probably all bottles, are mostly of thick green or greenish glass and have varying patterns of sunken dots and crossing ribs. The pattern on Number 120 must have been widely used in the Nishapur region, as fragments carrying it were found at K I, Tepe Madraseh, and Sabz Pushan.

Honeycomb patterns and variations thereof were expected to be found in greater numbers than they were (Nos. 123–125). The beaker Number 123 is an example of a vessel of com-

mon shape decorated with a simple but effective allover pattern, in this case a diamond design. Probably like many of these patterns, it imitates the appearance of costlier facet-cut vessels (see No. 167). Vessels with a pattern of concentric circles arranged in horizontal or vertical friezes, as in the jar Number 126, were widely found, in a range of glass colors at Sabz Pushan and elsewhere as well. Number 127, a type of jar with hardly any rim, known in undecorated glass (No. 58), and the bottle Number 128 display variations on the pattern of concentric circles. A honeycomb design decorates the bottle Number 129—astonishingly, the only example from Nishapur carrying this popular pattern.

The next five vessels, Numbers 130–134, have more complicated patterns. The shape of the bowl Number 130 has no exact counterpart among the undecorated bowls but belongs to the type with an outcurving wall. The molded pattern is difficult to discern; it may have been a design of ovals circumscribing petal forms, possibly alternating with another motif. Complex patterns are not well known because drawings were rarely made of vessels that entered the art market from commercial diggings.

The fragmentary vessel Number 131 belonged to a bottle with a slightly tapering body, according to the excavators' drawing. Fragments of this vessel were found at different findspots in Tepe Madraseh. Nothing comparable to the pattern with a trefoil design is known from Nishapur; but see the wheel-cut fragment Number 196.

The large bottles Numbers 133 and 134, of dark blue glass with a decoration of alternating types of palmettes that form a continuous band, are among the more important finds of the excavation. Unlike designs consisting of deep lines pressed into the glass (e.g., Hasson, *Early Islamic Glass*, fig. 31), the designs on these bottles have outlines that stand out in relief, creating, probably deliberately, an effect similar to that of relief-cut glass (for this type of relief-cut glass see, e.g., Charleston, *Masterpieces*, no. 27, pp. 70–71). Raised patterns of a related nature occur on plaster window frames in Nishapur (Wilkinson, *Nishapur: . . . Buildings*, figs. 1.176–84).

The decoration running around the body of these vessels displays ornamental forms very characteristic for the Nishapur region. Firstly, it contains two palmettes of specific types, each made up of two separate, mirror-image elements which together constitute the palmette. Thus, only when presented in a complete frieze are the palmette motifs discernible. A frieze of this kind appears on a relief-cut beaker in The Metropolitan Museum of Art (Jenkins, "Islamic Glass," no. 26). Secondly, above both palmettes are unconnected elements which can be interpreted as single leaves.

Historically resonant elements make up the palmettes on these bottles. The lower split half-palmette form can be derived from the motif of Sasanian wings (Kröger, *Sasanidischer Stuckdekor*, pp. 239–42, fig. 138a–e). It appears elsewhere in Nishapur as part of the design vocabulary of the plaster panels (Wilkinson, *Nishapur: . . . Buildings*, figs. 1.125, 1.137, 1.140, 1.146), is known from relief-cut glass (Jenkins, "Islamic Glass," no. 26, the Nishapur region[?]), and is similar to the animal wing depicted on the fragment Number 193. The other palmette on these bottles has two typical features, the sudden outward curve of the stems to circumscribe a circle and the isolated lozenge, which can be interpreted as the top leaf of the palmette. A palmette tree of this type, flanked by two birds, appears on the bottom of a relief-cut bowl in the Corning Museum of Glass (Fig. 9, p. 141) and has been shown to be a tree of life, an ancient and frequently recurring motif (Saldern, "Islamic . . . Cup," pp. 264ff.). In some examples the circle is a disk and the palmette has a heartlike shape. On a related relief-cut bowl (Kröger, *Glas*, no. 193) the palmette's elements are the same as those on this bottle. Palmettes represented as vine leaves emerging above a circle are also a characteristic motif in the Nishapur stuccos (Wilkinson, *Nishapur: . . . Buildings*, figs. 1.136–37, 1.139, 1.164) and in stuccos elsewhere as well.

Thus the frieze of Numbers 133 and 134 rests firmly within the framework of the design syntax and vocabulary employed in the Nishapur region, in a variety of mediums, during the ninth and tenth centuries. Most of the related examples are to be found among relief-cut glass, and this piece may exemplify the adaptation of a relief-cut decoration to the less expensive mold-

blown technique. The vessel may therefore be either contemporary with the cut glass works or of slightly later date.

It is astonishing that only a small number of mold-blown glass vessels were found; one would have expected many pieces of this common type of ware. It is also surprising to find so few decorative patterns and so little variation among the patterns. Most of them, such as dots and honeycomb patterns, are already well known from other excavations in Iraq and Iran. The decorative motifs of the bottles Numbers 133 and 134, however, are rare and may be specific to the Nishapur region.

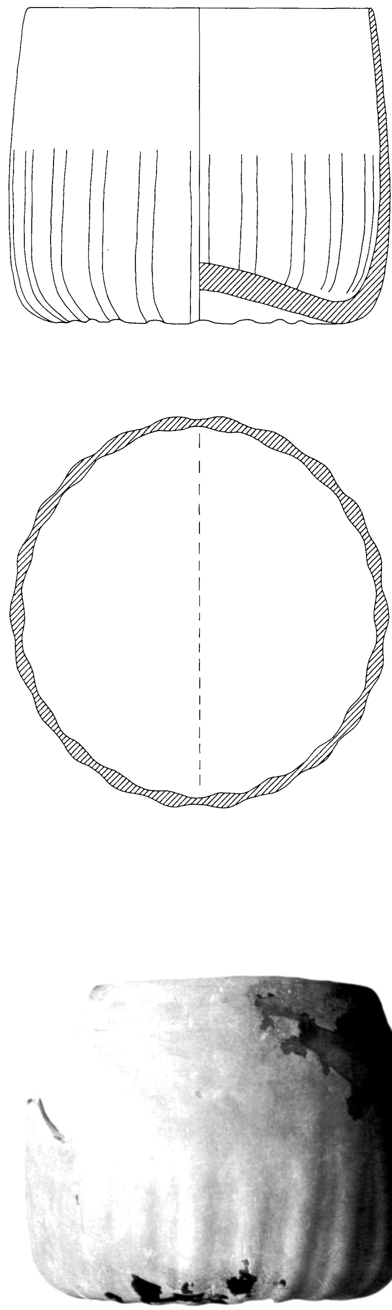
With most of the Nishapur glass finds there is nothing about the object itself that suggests a date, but mold-blown glass of this sort can generally be dated to the ninth or tenth century. A number of types usually dated to the eleventh or twelfth century are not found among the material from Nishapur. An example is the bottle type with a honeycomb pattern, cylindrical neck, and bulge below a flaring rim (e.g., Saldern, *Glas . . . Sammlung Hans Cohn*, no. 165; Kordmahini, *Glass*, pp. 54, 63; see also p. 59).

114. Bowl

Greenish. Heavily corroded
H. 8.2 cm; Diam. 10.3 cm
9th–10th century
1939; Sabz Pushan, *zir-i-zamin* in 3X
Discarded

Only half the vessel. Pushed-up center, slightly tapering walls. Vertical ribs beginning at base and ending on wall well below rim.

Glass decorated with molded vertical ribs was very common all across Iran in the early Islamic period; see Whitehouse, "Excavations," 1970, p. 6, pl. 12a; Lamm, "Verres . . . à Suse," pl. 77:1, 6. Other examples are in Lamm, *Glass from Iran*, pl. 18B–G, and Janpoladian, *Medieval Glassware*, pls. 12, 49, 62, 63, 67 (a bowl and beakers both tapering and cylindrical, with ribs that are usually diagonal). In addition, numerous fragments were unearthed in unpublished excavations, such as that at Takht-i Sulaimān. On many examples the ribs are less pronounced than they are on Number 114. Vessels of unknown Iranian provenance with similar ribs are a bowl erroneously dated to the Parthian period, Genito, *Vetri iranici*, pp. 15ff. (inv. no. 124), and Qaddumi, *Variety*, p. 104, bottom. For a ribbed bowl of different shape see Kordmahini, *Glass*, p. 121.



115. Bottle

Colorless. Heavily corroded
H. 4.1 cm; Diam. 3.1 cm; Th. at rim 0.2 cm
9th–10th century
1936; purchase
MMA 37.40.7



Complete. Small globular bottle with a long cylindrical neck. Flat base, small, crude pontil mark. Body and neck decorated with about twenty ribs, which twist slightly on the neck. See Lamm, *Mittelalterliche Gläser*, p. 48, pls. 8, 15.

116. Bottle

Greenish
H. 6.2 cm; Diam. 2.6 cm
9th–10th century
1938; Tepe Madraseh, D1
Tehran, Iran Bastan Museum 21259



Complete. A small ovoid bottle with vertical ribs. Bulge on neck; irregular, flaring rim.

For a nearly identical type found at Susa, a small bottle that Lamm thought was Syrian work of the sixth or seventh century, see Lamm, "Verres . . . à Suse," p. 361, pl. 77:1. For a metal vessel of similar type see Allan, *Nishapur: Metalwork of . . . Islamic Period*, no. 85.

117. Bottle

Glass color not discernible; gray and green mottled effect due to decay
H. 6.5 cm; Diam. 1.7 cm
9th–10th century
1937; Village Tepe
Tehran, Iran Bastan Museum 3957



Complete. A small cylindrical bottle with vertical ribs. Flat base with remains of glass lump from pontil. Neck with bulge and flaring rim.

118. Bottle

Dark green, yellowish tinge. Corrosion; iridescence (now cleaned)
H. 8.1 cm; Diam. 5.9 cm; Th. at rim 0.4 cm
9th–10th century
1938; Qanāt Tepe
MMA 39.40.130

Pieces missing from rim, now restored. Flat kick-base with small circular pontil mark. Globular body and irregularly slanting cylindrical neck with flaring rim. Pattern of sunken dots starting at the base and ending just below the shoulder.

Compare Lamm, *Glass from Iran*, pl. 21, and the jug in Kordmahini, *Glass*, p. 79. For bottles with a honeycomb pattern see Saldern, *Glassammlung Hentrich*, no. 282; Platz-Horster, *Antike Gläser*, no. 194.

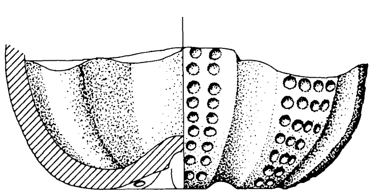


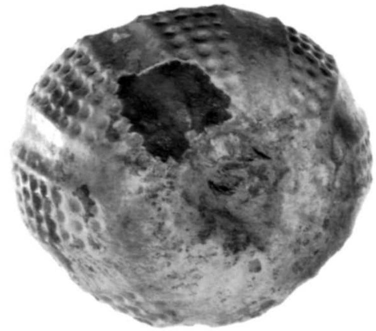
118

119. Fragment of a bottle(?)

Yellowish green. Heavily corroded and encrusted
H. 4.2 cm; Diam. 8 cm; Th. 0.5–0.6 cm
9th–10th century
1939; Sabz Pushan, *zir-i-zamin* in 3X
MMA 48.101.259

Sherd, probably the base of a bottle. Kick-base with crude pontil mark. Rising from the center of the base, vertical panels with sunken dots alternating with deep undecorated panels.





119

120. Bottle

Pale greenish
H. 12.8 cm; Diam. 6 cm
10th–11th century
1935; K1
Tehran, Iran Bastan Museum 3234



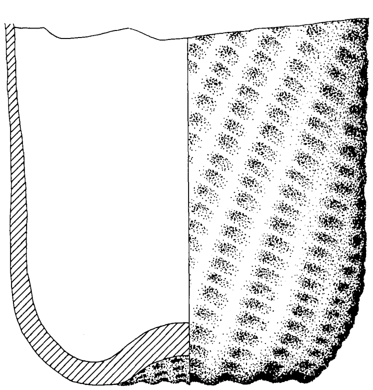
Broken, mended; pieces missing from wall and neck, now restored. Cylindrical bottle with short, irregularly widened neck. Flat base with kick and pontil mark. Allover cross-hatching design created by the crossing of two sets of diagonal ribs.

A somewhat similar bottle from Samarkand is datable to the ninth or tenth century (*Terres secrètes*, p. 26, nos. 317–18), and also compare these vessels with related patterns: Ohm, *Europäisches . . . Glas*, no. 79 (a bottle of thick green glass attributed to eighth–tenth-century Iran); Billeter, *Glas*, pp. 53, 54 (two ewers ascribed to eleventh–twelfth-century Gurgān); Saldern, *Glas . . . Sammlung Hans Cohn*, no. 173; Saldern, *Glassammlung Hentrich*, nos. 286, 289; Kordmahini, *Glass*, p. 75. See also Janpoladian, *Medieval Glassware*, pl. 67, and *Glass . . . Smith Collection*, no. 480 (a large bottle from Egypt with swirling ridges) for examples that demonstrate the pattern's popularity outside Iran.

121. Bottle

Green
H. 7.5 cm; Diam. 7.8 cm
10th–11th century
1939; Sabz Pushan, *zir-i-zamin* in alley by 1D
Discarded

Lower half of cylindrical bottle. Thick flat base with kick. Allover design of cross-hatching created by a grid of diagonal ribs.



122. Bottle

Green
Dimensions unknown
10th–11th century
1939; Tepe Madraseh, U1–2 and S9
Discarded

Half of a bottle, probably of the same type as Number 121.

123. Beaker

Yellowish green. Heavily encrusted
H. 10.8 cm; Diam.: base 10.5 cm, rim 11.1 cm; Th. at rim 0.2 cm
9th–10th century
1937; Sabz Pushan, well in 10E
MMA 38.40.260

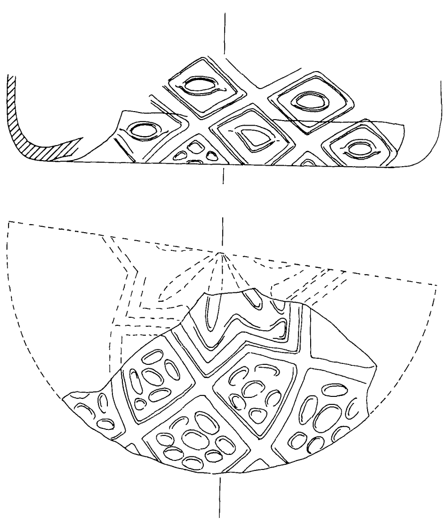


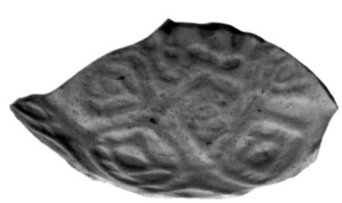
Broken, mended; missing pieces now restored. Thickened base with kick in center and pontil mark. Vertical, slightly bulging walls. Honeycomb pattern beginning at base with ovals, turning into lozenges, ending 1.5 cm below the rim.

For the many analogous examples see Lamm, *Glass from Iran*, pl. 21 I; Jenkins, "Islamic Glass," no. 13. The examples vary considerably in glass quality and workmanship. The type is also known from Mesopotamia, where it was common probably from the eighth century; see Negro Ponzi, "Islamic Glassware," pp. 100–101, fig. 57, no. 51; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 798, 818–24.

124. Fragment of a bottle(?)

Green, blue tinge
H. 2.5 cm; Diam. 10.5 cm
9th–11th century
1939; Sabz Pushan, *zir-i-zamin* in 3X
MMA 48.101.258





Fragment from the base of a vessel, probably a bottle. Pushed-up base with star center ringed by a pattern of diamonds enclosing rosettes and beyond them lozenges enclosing circles around central bosses.

For a bowl with flaring sides and a comparable though not identical pattern, see Jenkins, "Islamic Glass," no. 38 (eleventh century). On the evidence of a lamp stand and a polycandelon, Jenkins argues that such bowls may have been used as lamps. For the pattern, compare the cup with a handle in Auth, *Ancient Glass*, no. 223.

125. Bottle

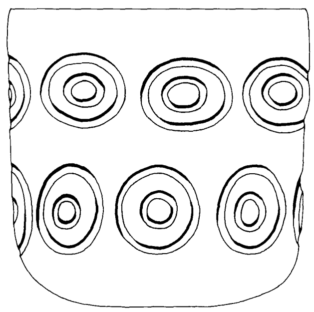
Colorless, yellowish green tinge. Patchy corrosion; incrustation
H. 4.2 cm; Diam. 4.8 cm; Th. at neck 0.15 cm
9th–11th century
1939; Sabz Pushan, *zir-i-zamin* in alley by 1D
MMA 48.101.271



Neck missing. Small flat base with pontil mark. Swelling globular form, nearly right-angled at shoulder, tapering below. Neck broken off. Sunken horizontal ring dividing upper and lower body. On lower half a number of radiating ribs (probably seven) below a frieze of rectangles. On upper half a frieze of triangles alternating with crescent shapes. Shoulder apparently undecorated.

126. Beaker

Colorless
H. 7.2 cm; Diam. 7.5 cm
9th–11th century
1939; Sabz Pushan, *zir-i-zamin* in 3 X
Discarded



Fragment making possible a drawing. Flat base leading to vertical, slightly flaring wall. Around the body a double row of circles enclosing circlets.

Beakers with this type of decoration must have been very popular in Nishapur, since many comparable fragments in colorless or in greenish glass were found in other Nishapur locations as well. However, there is no information on exact findspots.

For a related pattern see a bottle in Qaddumi, *Variety*, p. 115, top left.

---

127. Jar

Colorless, possibly yellowish tinge. Surface badly corroded; iridescent
H. 3.2 cm; Diam.: 3.7 cm, at opening 1.7 cm; Th. at rim 0.15 cm
9th–10th century
1937; Village Tepe
MMA 38.40.229

Complete(?). Globular body with slight kick in base, pontil mark in center. On the body a frieze of panels divided by pairs of vertical lines, the panels enclosing larger circles surrounding circlets. Additional circlets in spandrels. Decoration from base to rim.

A simpler version of the design, with just one row of circles with central circlets, appears on a fragmentary bottle dated to the tenth century; see Lamm, "Verres . . . à Suse," p. 364 and pl. 77:7.



127

---

128. Bottle

Colorless, greenish tinge. Patchy corrosion, mainly on body of vessel; iridescence (now cleaned)
H. 10.5 cm; Diam.: 8.5 cm, at rim 5.9 cm; Th. at rim 0.2 cm
10th century
1938; Qanāt Tepe, well in 1 A 2
MMA 39.40.45

Nearly complete, one piece missing and restored. Globular body; large, somewhat flaring neck. Flat base with pontil mark. On the base eight ribs forming a starlike pattern with circlets in the spandrels. On the body a frieze of panels separated by twin ribs and containing circles paired vertically. Undecorated neck somewhat sunk into the body.

For bottles of this kind with different patterns, see Saldern, *Glassammlung Hentrich*, nos. 281–82.



129. Bottle

Yellowish
H. 9.5 cm; Diam. 9 cm
9th–10th century
1939; near Tepe Madraseh
Tehran, Iran Bastan Museum



Complete. Globular lower body, sharp shoulder, short near-cylindrical neck. Vertical ribs from base to the beginning of the neck at regular intervals, suggesting a continuous honeycomb pattern.

Compare Lamm, *Glass from Iran*, pls. 4C, 21F.

130. Bowl

Greenish
H. 4.8 cm; Diam. 9.5 cm
10th–11th century
1937; Sabz Pushan
Tehran, Iran Bastan Museum

Broken, mended; one-third of wall missing. Bowl with flaring sides. Wall turned outward at rim(?). On the wall a continuous frieze of ovals with circumscribed petal forms(?).

For a larger version of this bowl see Saldern, *Glassammlung Hentrich*, no. 312 (tenth–twelfth century); also, no. 308 for a jar with a pattern of petals (ninth–twelfth century).

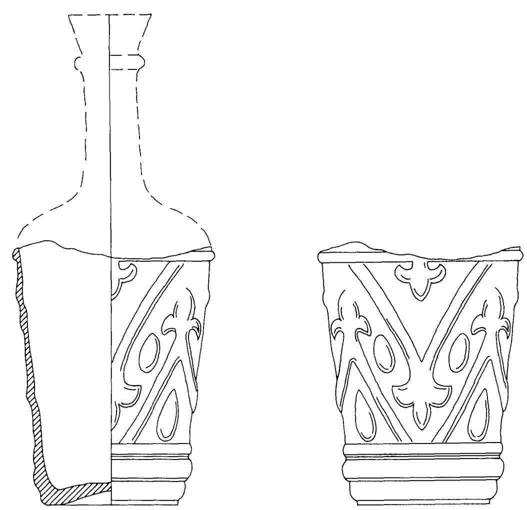


130

131. Part of a bottle(?)

Greenish
H. 7.2 cm; restored H. 13.3 cm; Diam. 5.6 cm
10th century
1939; Tepe Madraseh, well in S8
Discarded

Lower section of a vessel, probably a bottle. Neck and parts of shoulder missing. Flat kick-base, tapering sides. Pattern of trefoils in zigzag panels. Made in a two-part mold; seam visible.





132. Bottle

Greenish
Dimensions not known
10th century
1939; Tepe Madraseh, W1
Discarded

State of preservation not known. Same pattern as that on Number 131.

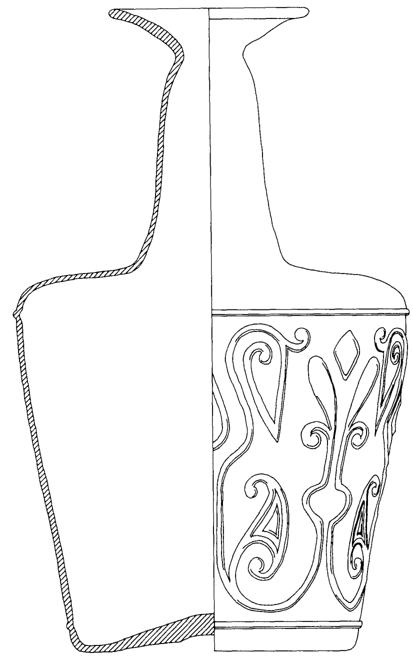
---

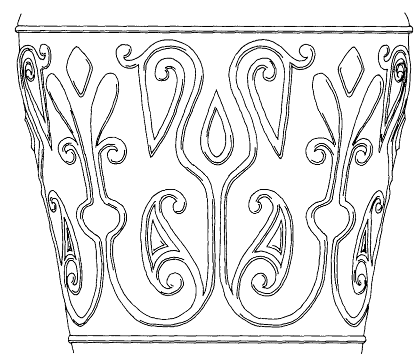
133. Bottle

Dark blue. Corroded; iridescent
H. 19.7 cm; Diam. 12.6 cm
10th century
1939; Tepe Madraseh, T1
MMA 48.101.60

Restored from fragments of two identical bottles. Flat kick-base with pontil mark. Slightly flaring body and tapering neck, flaring rim above a constriction. Blown in a two-part mold with vertical joints badly fitted. On the body between horizontal ridges, a frieze of two types of palmette plants flanked by half-palmettes. Outlines of the design in relief.

For an undecorated deep blue bottle of this type see Saldern, *Glassammlung Hentrich*, no. 362. A larger bottle of similar shape, its glass a lighter shade of blue, has a pattern of reciprocal palmettes; the outlines of the pattern are pressed into the glass. See Jenkins, ed., *Islamic Art . . . Kuwait*, LNS 8 G. A truncated pyramidal vessel of dark blue glass also carries a band of reciprocal half-palmettes; Jenkins, "Islamic Glass," no. 34. For a different type of bottle see *3000 [Dreitausend] Jahre*, no. 548. It is noteworthy that much of the parallel material is also of blue glass. Much of the glass published in Lamm, *Glass from Iran*, pls. 24–26, bears little relation to this vessel but demonstrates, as does no. 471 in *Glass . . . Smith Collection*, that a large number of very different patterns were executed in mold-blown glass.





133

---

134. Fragments of a bottle

Dark blue
Dimensions not known
10th century
1939; Tepe Madraseh, U3
Discarded

Fragments of a bottle from same mold as Number 133.

Vessels with Pinched Decoration

In the decoration of glass by pinching, the vessel was "impressed in the surface while the material was hot by an instrument which must have resembled a pair of tongs.... The impressions made by the outlines of the decoration are repeated on the inside of the vessel in exactly the same places, indicating that the tongs had identical patterns in relief on both jaws; if squeezed hard enough, they would cut right through the walls of the glass" (Lane, "Medieval Finds," p. 70); see the cross-section drawing for Number 135. Because the effect was achieved with a tongs, only open vessels could be decorated by this method. Plates with wide rims could be pinched on the cavetto or on the rim (Pinder-Wilson and Scanlon, "Glass... Fustat: 1972–1980," fig. 10, no. 10, and unpublished fragments from Takht-i Sulaimān). Ewers could be pinched if the neck was cylindrical, but only the neck was decorated and the body remained plain, unless the ewer was made in two sections (Qaddumi, *Variety*, ill. p. 112). Most suited to this technique and therefore its most common object was the cylindrical beaker. All the pinch-decorated fragments found in the Nishapur excavations belong in this category. Only six sets of fragments were found, from beakers of different sizes. They are of colorless glass with a greenish or yellow greenish tinge. Probably by chance, the findspots show a concentration at Qanāt Tepe: three fragmentary vessels come from a deep level in Qanāt Tepe (Nos. 136, 138, 140), one from a top level of Tepe Alp Arslan (No. 137), and one from Tepe Madraseh (No. 135). For one fragment (No. 139) no provenance was given.

The designs can be divided into four groups: simple vertical lines joined by half circles (No. 135), a design not previously recorded in the literature; stylized palmettes arranged vertically (Nos. 136, 137); concentric circles with or without a central dot (Nos. 138, 139); and concentric squares associated with blocks of dots and V-shaped motifs (No. 140). Division of the surface into panels by vertical rows of dots or dashes created by the repetition of a motif or motifs is a characteristic mode of pinched decoration (No. 136). If the vessel is flared in the course of its manufacture, the pattern previously pinched into the glass becomes widened toward the rim (Nos. 139, 140).

Glass decorated by pinching has been found in Egypt, Israel, Syria, Iraq, Iran, and other locations. Lamm was of the opinion that the technique originated in Egypt and spread to Iraq and Iran during the ninth century (Lamm, "Glass and Hard Stone," p. 2598), but we do not yet have enough information to form any certain ideas about its place of origin. It is still reasonable to hypothesize that the technique developed in an early Islamic glasshouse, possibly by the eighth century, and because of its success rapidly spread to neighboring countries. Vessels with pinched decoration can usually be dated to the ninth or tenth century. A pinched beaker from the Famen Temple treasure, which must have reached China before A.D. 874, shows that vessels in this technique were exported to China as early as the mid-ninth century; it is an additional argument for the early date of this group (An Jiayao, "Dated Islamic Glass," p. 124, fig. 9).

Much material in this technique is still unpublished. However, it seems very likely that when more data on the glass and the designs become available, fashions favored in different countries will be recognizable, and in addition a standard repertoire will emerge of motifs used throughout the Islamic world. It will probably include circles, ovals and lozenges, inscriptions, and a few other motifs. On the other hand, there is not to my knowledge any evidence that the highly stylized birds known from Iran have an Egyptian origin.[1] It is possible that clearly representational birds are more typical for Egypt (Lamm, *Mittelalterliche Gläser*, pl. 16) and Syria (Lane, "Medieval Finds," fig. 12 A–B). The amphora motif from al-Mīnā (Lane, "Medieval Finds," fig. 12 D) appears to be unknown in Iran. It is very likely, then, that certain motifs are typical for certain countries or regions. Since the Nishapur excavations yielded a very limited

1. For the first publication of a stylized animal from Iran see Rackham, "Glass Beaker," pp. 207–8, figs. 1, 2. Identical fragments said to be from the Nishapur region show that these highly stylized animals are Iranian and were probably fashionable in Nishapur.

number of pinched glass fragments, motifs, and vessel shapes, the subject cannot be treated here in further detail. However, vessels not excavated archaeologically but said to be from Nishapur add a number of new designs to our pool of information, as do the unpublished glass objects from Takht-i Sulaimān.[2]

Pinched glass was successful for only a limited time. When the cylindrical beaker was finally replaced by the flaring beaker, the technique seems to have vanished. I am aware of no vessels in this technique that can be dated later than the tenth century.

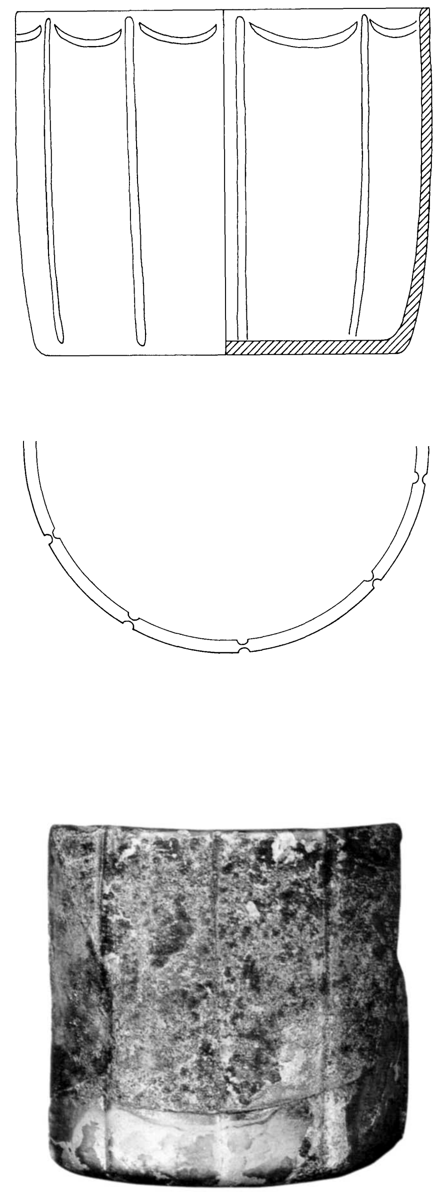
2. For examples of vessels in the pinched or pincered technique, not all from excavations, see Lamm, *Glas von Samarra*, pp. 45–48, no. 165, fig. 32, nos. 67, 68, pls. 3, 4; idem, "Verres...à Suse," pl. 79:11–13; Schnyder, "Keramik," p. 190, fig. 91; Kröger, *Parthisches...Glasfunde von Ktesiphon*, nos. 923–34. The unique piece in Dura-Europos (Clairmont, *Glass Vessels...Dura-Europos*, p. 54, no. 225, pl. 24) is an Islamic intrusion. See also Lamm, *Mittelalterliche Gläser*, pp. 61–71, pls. 16–19; idem, *Glass from Iran*, p. 12, pls. 81, 29 A–C; Clairmont, "Some Islamic Glass," no. 2; Kröger, *Glas*, nos. 110–11; Qaddumi, *Variety*, p. 112 (LNS 124G ewer).

135. Part of a beaker

Colorless, greenish yellow tinge. Heavily corroded; iridescent
H. 7.6 cm; Diam.: base 8.5 cm, rim 9.8 cm; Th. at rim 0.2–0.3 cm
9th–10th century
1939; Tepe Madraseh, W1
MMA 48.101.265

Broken, mended; now restored. Cylindrical beaker; flat base with small pontil mark (diam. 1.0 cm). On both inside and outside of the body, regularly spaced vertical grooves which flank crescent curves near the rim.

This design has some relation to a motif of continuous arcades on cut vessels: see Lamm, *Glas von Samarra*, p. 67, fig. 35, no. 176, and a beaker in the Corning Museum of Glass, 62.1.3. Half circles run around the rim of a cut glass vessel of different shape: see Janpoladian, *Medieval Glassware*, pl. 41 and drawing on pl. 12:3.



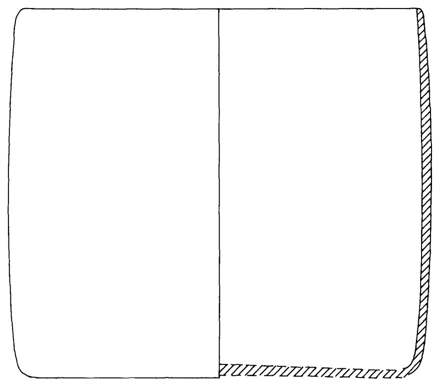
135

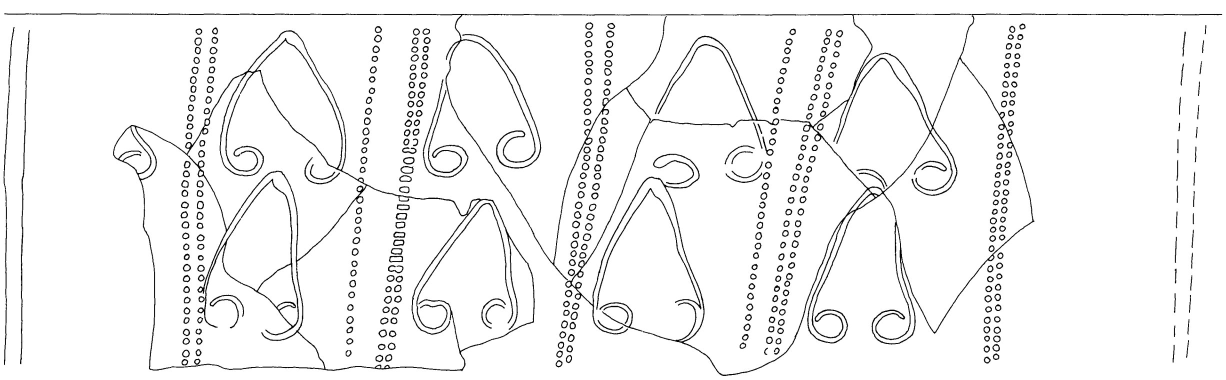
136. Fragments of a beaker

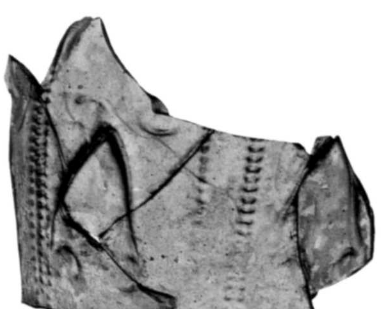
Colorless, greenish tinge. Patchy iridescence
H. 7.8 cm; Diam. 9.2 cm
9th–10th century
1939; Qanāt Tepe, deep level
MMA 48.101.268 a–c

Three joining fragments from a cylindrical beaker. On the body, panels containing two stylized palmettes one above the other are separated by two or three vertical rows of dots. Six other fragments, joining to one another, originally documented but now missing.

For a pinched beaker displaying a stylized tree with a more pronounced palmette, flanked by a row of vertical lozenges, see Saldern, "Sassanidische... Gläser," pp. 59–60, fig. 17. The pattern on Numbers 136 and 137 was common, and a number of parallels can be cited. Vertically ranged stylized palmettes divided by vertical lines are found on a beaker from the art market, said to be mold blown but more probably pinched (Kevorkian and Loudmer, *Verres antiques*, no. 617). Palmettes are arranged in a horizontal line with other patterns on another beaker (Lamm, *Glass from Iran*, pl. 29 B). The stylized palmette also decorates mold-blown glass (Kröger, *Glas*, no. 87, and *3000 [Dreitausend] Jahre*, no. 547) and wheel-cut glass: see Numbers 222 and 223.







136



Now missing

137. Beaker

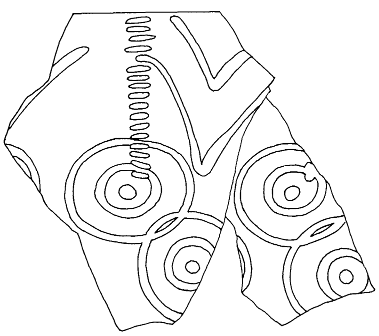
Color and dimensions unknown
9th–10th century
1939; Tepe Alp Arslan, top level
Discarded

State of preservation not known. A piece similar to Number 136.

---

138. Fragment of a beaker

Colorless, greenish
H. 6.5 cm; W. 7.5 cm
9th–10th century
1939; Qanāt Tepe, deep level
Discarded





Rim section of a cylindrical vessel. Pinched pattern of concentric rings with central dot, overlapping one another, and V-shaped forms. Small stripe of vertically stacked dashes, pinched to the rim, overlapping one of the sets of rings.

For circles and V shapes see Lamm, *Glass from Iran*, pl. 29A. The pattern of pinched concentric circles may be related to the wheel-cut design of raised disks and nipples; see Pinder-Wilson and Scanlon, "Glass... Fustat: 1972–1980," no. 10, fig. 10.

---

139. Fragment of a beaker

Colorless, greenish yellow tinge. Extensive corrosion
H. (reconstructed) 6 cm; Diam. (reconstructed) 6.5 cm
9th–10th century
193?; provenance unknown
MMA 48.101.284



Rim section of a cylindrical vessel, possibly a beaker, with pinched pattern of concentric rings.

For circles see Lamm, *Glass from Iran*, pl. 29A; Kröger, *Parthisches... Glasfunde von Ktesiphon*, no. 923.

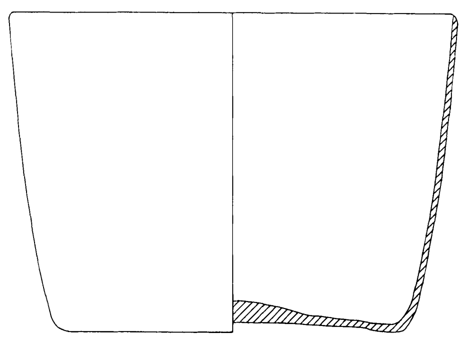
---

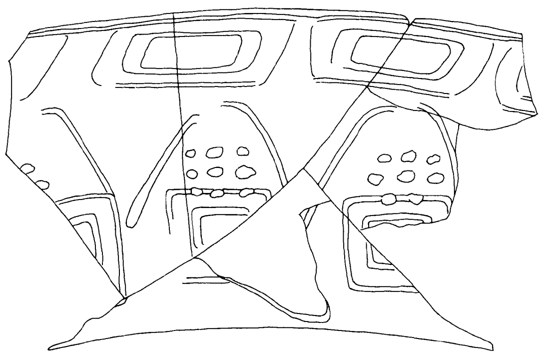
140. Part of a beaker

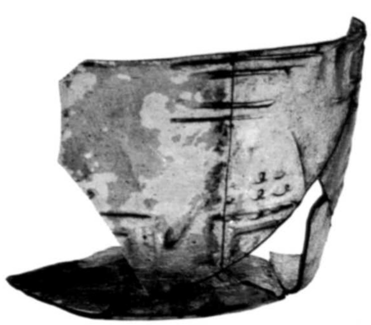
Colorless, greenish tinge. Patchy corrosion, iridescence (now cleaned)
H. 6.7 cm; Diam. 10.3 cm; Th. at rim 0.2 cm
9th–10th century
1939; Qanāt Tepe, deep level
MMA 48.101.57

Broken, mended; missing areas now restored. Flat base, slightly kicked center with circular pontil mark. On the body a frieze of upside-down V shapes, each filled with a block of nine circular depressions, and below, concentric squares. Above, near the rim, concentric rectangles, which were pinched as squares but elongated when the rim was widened.

For squares see Lamm, "Verres . . . à Suse," pl. 79:11.







Stamped Decoration

The technique of stamping patterns into glass is related to that of pinching; stamped patterns were "applied by means of a tong-like instrument whose smooth inner jaw forced the glass into the countersunk pattern on the outer one" (Lane, "Medieval Finds," p. 69). It was also possible to impress a simple stamp carrying a countersunk pattern into a lump of molten glass before or after it was applied to the vessel, as was done to make Numbers 142–147. Both tongs and stamps were probably made of iron.

Glass decorated in this technique seems to have been unusual. Among the Nishapur finds, there is only one vessel that may have been stamped and six glass stamps that in all probability were attached to vessels, although what kind of vessel is not known. The stamped vessel was found in Tepe Madraseh. The stamps are unfortunately mostly without provenance; one is described as being from Qanāt Tepe (No. 144) and a second from Tepe Madraseh (No. 147). The glass used is mainly colorless or colorless with a greenish tinge.

So that the tongs could be used on narrow-necked vessels like bottles, jugs, or ewers, the vessels were made in two sections. After the pattern was stamped onto the lower part of the jug Number 141, its upper and lower parts were joined. The handle was of course added subsequently. Vessels thus manufactured are easily recognizable by the presence of a horizontal seam. Glassworkers soon realized that with this method of fabrication, different glass colors could be employed for the two sections of the vessel. The lower, decorated part is sometimes made of colorless glass and the upper part of blue glass.

With Number 141, the same colorless glass makes up both sections of the jug. The shape occurs frequently and was popular in Nishapur (another example, with cut decoration, is Number 228). The decoration on Number 141, stamped into the lower body of the vessel, consists of oval medallions each containing a ring of disks around a slightly raised center. This is a very popular pattern in early Islamic glass and could be created by either mold-blowing, pinching, or stamping. The only way to determine with certainty which of the techniques was used would be to feel the pattern from both sides; but if the pattern stands out in relief and the vessel is made in two parts, it is likely that the decoration was achieved by stamping.

The vessel stamps Numbers 142–147 were mainly made by stamping a die on a lump of glass that had been stuck onto a vessel. Except for the discarded piece Number 142, which could have been a coin-shaped stamp that functioned as an independent object, and Number 147, whose use is not known, every vessel stamp includes remains of the wall of the vessel to which it was attached. The stamps are all circular, with an average diameter of 2.2 centimeters. There are some distortions and flaws on the surface of the impressions, and because the stamping was done while the glass was still hot, there is typically a bulge on the back, visible on Numbers 143–145. There was no rule about stamping in a certain direction; the angles of the writing vary (horizontal on Nos. 143, 144, and probably 147; vertical on Nos. 145 and 146). The border can be a simple line (Nos. 142, 143), a row of dots between two lines (Nos. 144–146), or something more elaborate (No. 147). The stamps carry one (No. 142), two (Nos. 143–146), or three (No. 147) lines of Arabic writing. The script is either cursive (No. 143) or Kufic (Nos. 142, 144–147). The inscriptions on Numbers 142–143 and 147 have not been deciphered. That on Number 144 can be read as the name "ʿAbd al-Malik" or "ʿAbd al-Walīd." Those on Numbers 145 and 146 can be read as "ʿamal Manṣūr" (work of Manṣūr). Nothing about these inscriptions suggests that they record an official measure, as is known to have occurred in Egypt (Morton, *Catalogue of... Glass Stamps*, p. 31).

Also not known is what type of vessel these stamps decorated and where on the vessel they were attached. Numbers 143–147 all seem to be stamps with part of a loop handle of the sort common on lamps like Number 235; however, not a single stamped fragment large enough to indicate what type of vessel it came from seems to have been excavated at any site. Number 147 signals a different kind of usage, but it is unclear

whether it belonged to a handle or was used in some other way. Although it was photographed with the writing right side up, it may have been used the other way, in which case the writing would have appeared upside down. The questions raised by these stamps cannot be answered until more finds emerge.

In terms of form and motif these vessel stamps can be seen as a continuation of Sasanian vessel stamps, round disks with representations of winged horses, birds, or other subjects, and sometimes with inscriptions and pearl borders. Use of the Sasanian-type stamps continued into the early Islamic period. Some examples carry inscriptions in Kufic script (K. Erdmann, "Zur Datierung"; idem, "Noch einmal zur Datierung"; idem, "Fatimidischen Bergkristallkannen"; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 165–66). Vessel stamps with comparable inscriptions have been found in Iran (Lamm, *Glass from Iran*, p. 11, pl. 28) and in Transoxiana (Abdurazakov et al., *Steklodeliye Srednei*, fig. 37). Their inscriptions generally contain a place name preceded by the phrase "made in." One example was read as "made by Abu . . . ," making it a close parallel to Numbers 145 and 146. A few stamps with Kufic inscriptions are also said to have been excavated at Susa but remain unpublished. None of these examples yield much information about the original use. A find from the excavations in Dwin, however, for which a date in the eighth or ninth century was proposed, shows that some stamps may have been attached to the handles of vessels (Janpoladian and Kalantarian, *Trade Relations*, pl. 41). This is corroborated by the upper part of a pitcher formerly in the Museum für Islamische Kunst in Berlin (I. 2851), which had an inscribed stamp as a thumb-rest on the handle; such a use was probably much more common than existing evidence would indicate.

141. Jug

Colorless(?)
H. 15.5 cm; Diam.: base 5 cm, body 10 cm, rim 9 cm
10th century
1938; Tepe Madraseh, drain in H4, lower level
Tehran, Iran Bastan Museum

Broken, mended; a few missing pieces, now restored. Ring base, globular body with join near its top. Flaring neck, applied handle with thumb-rest. On the body below the join a frieze of oval medallions, each with a raised central disk surrounded by smaller disks.

Reference: Lacam, "Contribution," fig. 8 (probably this vessel, but with the provenance erroneously given as Rayy).

Numerous two-part jugs and bottles are known, but in most cases the upper half is of dark blue glass; see Fukai, *Persian Glass*, pl. 70 (described as mold blown); Saldern, *Glassammlung Hentrich*, no. 307; Hasson, *Early Islamic Glass*, ill. 35; Saldern, *Glas . . . Sammlung Hans Cohn*, no. 180 (with literature); *Art*



from the World of Islam, Humlebaek, no. 21; Kordmahini, *Glass*, p. 105. For stamped medallions see Kröger, *Glas*, nos. 96–99, 103, and also the bottles nos. 105, 112, and, from Egypt, 104. The decoration of many of these vessels is described as being in the pinched technique. Distinguishing pinched from stamped decoration is difficult when the vessel is intact.

---

142. Stamp

Colorless
Diam. 2.7 cm
9th–10th century
1939; exact provenance unknown
Discarded



Nearly circular stamp impressed in the center with one word in Kufic script, not deciphered. Simple circular border. This piece does not look like it was a prunt attached to a vessel. It could have been a stamp that for some reason was not fixed to the wall of a vessel.

---

143. Prunt

Colorless, greenish tinge. Black corrosion, patchy iridescence
H. 3 cm; W. 2.3 cm; Th. of attached wall of vessel 0.2 cm
9th–10th century
1939; exact provenance unknown
MMA 40.170.446

Prunt with part of loop handle and fragment of the vessel to which it was attached, all of the same glass color. Prunt horizontally impressed by a circular stamp (diam. 2.2 cm) with two-line inscription in a cursive script, not deciphered. Simple circular border.



143

---

144. Prunt

Colorless, light green tinge(?). Whitish corrosion
L. 3.5 cm; W. 2.2 cm; Th. of attached wall of vessel 0.1 cm
9th–10th century
1939; Qanāt Tepe, 6A3
MMA 40.170.445



Prunt with part of loop handle and fragment of vessel to which it was attached, all of the same color. Prunt impressed with a circular stamp (diam. 2.2 cm) with two lines in Kufic script readable as "ʿAbd al-Malik" or "ʿAbd al-Walīd" (a name). Border with a row of dots between simple lines.

The row of dots can be related to those on Sasanian and early Islamic glass prunts; see Kröger, *Parthisches ... Glasfunde von Ktesiphon*, nos. 165–66. It is also interesting that a group of glass ewers of the ninth to tenth century have an inscription between bands with raised dots; see D. S. Rice, "Early Signed ... Glass," pp. 8ff.

---

145. Prunt

Greenish, yellowish tinge. Corrosion
L. 4.7 cm; W. 2.4 cm; Th. of attached wall of vessel 0.1 cm
9th–10th century
1938; exact provenance unknown
MMA 40.170.447



Prunt with loop handle and fragment of the vessel to which it was attached, all of the same color. Prunt impressed with a circular stamp (diam. 1.8 cm) with two lines in Kufic script readable as "ʿamal Manṣūr" (work of Manṣūr). The lines of script impressed vertically. Bordered by a row of dots.

---

146. Prunt

Colorless, greenish tinge
L. 5 cm; Diam. 2.5 cm
9th–10th century
1939; exact provenance unknown
Discarded



146

Prunt with loop handle and part of wall of the vessel to which it was attached. Prunt impressed by a circular stamp with two-line inscription readable as "ʿamal Manṣūr" (work of Manṣūr), the lines running vertically. Border with a row of dots between simple lines.

---

147. Prunt

Colorless
L. 4.5 cm; Diam. 2.5 cm
9th–10th century
1939; Tepe Madraseh, drain in H2
Discarded



Prunt with remains of a handle(?), both of thick glass. Prunt stamped by a circular stamp with three lines in Kufic script, positioned so script appears upside down. Script not deciphered. Border with a circular(?) frieze of indentations.

Vessels with Applied Decoration

Because heated glass is extremely pliable, it is possible to draw glass into threads and with them decorate the still-hot surface of a vessel. A strip of warm glass can be made to adhere to a vessel horizontally (Nos. 148–155) or vertically (Nos. 156, 157) or in designs that suggest the work of brush or pen, as on the beaker Number 152 and the ewer Number 160. The threads can be fused into the vessel surface (Nos. 156, 157) or made to stand out in relief (Nos. 158, 160); they can be of the same color as the vessel or of a different color. Wherever glass was manufactured, applied decoration was practiced. In the Islamic world, Iranian glass artists seem to have reached a special level of virtuosity with the technique.

Fourteen vessels or fragments of vessels with applied decoration are presented here. Two additional fragments are from lamps and appear in the section on lamps (Nos. 234, 236).

Four fragments with applied decoration were found at Tepe Madraseh, six are from Sabz Pushan, the goblet Number 151 is from Village Tepe, and the large ewer Number 160 is from Qanāt Tepe. The glass used was mainly colorless or colorless with a yellowish green tinge. On some examples the applied threads are of the same color as the vessel; when they differ, the only contrasting combination is of blue or light green threads applied to a colorless vessel. Those are the same contrasting colors found in cameo glass, a technique related in principle to applied decoration, since in both cases a second layer is applied on an existing glass.

Threads were applied to vessels of the usual shapes: plates and bowls (Nos. 148–150), bottles (Nos. 153–159), and ewers (Nos. 160, 161). Applied decoration also appears on the only goblet found in the excavations (No. 151) and on a beaker (No. 152). On most vessels the threads are applied horizontally or vertically, decorative schemes known from Roman and Sasanian glassmakers. Only the more complicated patterns speak a new artistic language.

The plates are of a shallow type with vertical walls and wide rims (Nos. 149, 150) or slightly flaring walls. Number 150, not the largest plate found in the excavations, is the only one that has a high interior ring comparable to those on the beakers Numbers 37–39 and the bottles Numbers 154 and 155. All three plates are colorless with a thread of blue glass, which is always applied to the outside. Number 149, with its single thread around the rim, relates to a common type of bottle represented by Number 153. Numbers 148 and 150, both from room Y6 in Tepe Madraseh, reveal the same principle of decoration, with a thicker thread on the rim and four very thin threads on the underside of the rim (No. 150) or the outer wall (No. 148). The existence of comparable fragments from Samarra shows that this type of decoration was widely used in the ʿAbbasid period.

The bottles are all of the type with a globular body. Most have a constricted neck (Nos. 154–157), a feature generally accompanied by applied decoration. The decorative devices on the bottles are of three types: a single thread (No. 153), a thread wound spirally (Nos. 158, 159), or threads applied vertically (Nos. 156, 157). The simplest way to decorate a bottle is to apply a thread of a different color to the rim, a method that has been used effectively on Number 153, where the blue thread contrasts with the colorless bottle.

The two bottles 154 and 155 are of a different type. Strictly speaking they do not belong in this category, as the protruding ring is found on the interior wall and was created not by application of a thread to the body but by constriction. The interior ring seems to relate these bottles to the beakers Numbers 37–39 and the plate Number 150. But in those examples the ring apparently provides stability, which is not the case with these medium-sized bottles. Their interior ring may be a decorative feature or it may have served a specific purpose, for example to help stir a liquid. A number of such bottles and jugs are known, and it is difficult to determine what the function of the rings was.

Since these two bottles are from the same findspot, it is very likely that they were made by the same glassmaker. The same shape is found on two bottles decorated with vertically applied threads (Nos. 156, 157), the only known exam-

ples of this type of decoration. The threads, of the same glass as the vessel, are nearly fused; in marked contrast is the thread on Number 158, which was applied horizontally and wound around the bottle from bottom to neck in a spiral. The thread is of a contrasting greenish glass, making the design particularly effective. This type of decoration stands in an age-old tradition.

Others of the vessels show more complex applied patterns which, interestingly, are of the same glass as the vessel itself. The only stemmed goblet excavated, Number 151, has an applied and pincered decoration on the bowl. Goblets of this type, their stems usually ribbed all around, are known from sites in Iraq and northern Iran. There are fewer examples from eastern Iran. However, the goblets are so fragile that most often only parts of their stems remain, making it difficult to evaluate the extent to which the goblets were used in eastern Iran. The decorative motif on this goblet is sometimes called a spectacle pattern. This piece may be the first example of it found in Iran. The motif, which was widely used in the eastern Mediterranean in Roman times and continued to be fashionable in the early Islamic period, might have been well known in Iran.

Number 152 is a beaker of the type with a low splayed foot. Parallel adjoining threads form a collar around the lower part of the wall. This feature links the beaker to a group of footed goblets with collars which often have applied decoration (Saldern, "Sassanidische... Gläser," pp. 57–58, fig. 15; idem, *Glas... Sammlung Hans Cohn*, no. 185). The applied decoration on this vessel is of the type that reminds one of writing with brush or pen; its design includes a large curl reminiscent of the Roman snake-thread motif (Saldern, *Glas... Sammlung Hans Cohn*, no. 83).

A related kind of decoration appears on the fragmentary ewer Number 160. Between horizontal threads is a frieze, a zigzag filled with a sort of scribbling that is not meant to represent anything specific but alludes to writing. Decoration of this sort on other vessels sometimes contains figures. The separately made openwork handle should be compared with rock crystal and carved glass examples, which it perhaps imitates.

Number 161, a fragment, is from a ewer of another, differently shaped type. Since only the upper part survives, it is impossible to say how it was decorated; threads around the neck and spout are typical for many kinds of ewers.

The decorative application to vessels of threads running horizontally or vertically was practiced throughout the first millennium and evidently also in early Islamic times. But the virtuosic application of threads as if the artist were writing with a brush is a particular fashion that seems to have appeared sometime in the eleventh century and to have continued thereafter. Finds of this type from Dwin in Armenia have been given a twelfth-to-thirteenth-century date (Janpoladian, *Medieval Glassware*, p. 50, pl. 16). This makes it possible for a number of vessels with applied threads (Saldern, "Gläserner Schlangenkorb") to be securely assigned a date later than had previously been thought appropriate.

Decoration with prunts should probably be thought of in connection with the virtuoso style of applied threads. No vessels with applied prunts were excavated, but some that may have been made in Nishapur (Baumgartner and Krueger, *Phönix*, no. 166; Charleston, "Glass," pp. 298–99, pl. 7) have been reasonably dated to the twelfth to thirteenth century (Clairmont, *Benaki Museum*, pp. 79–80, nos. 269–73).

Why these changes in decorative method came about is a question that cannot be answered yet.

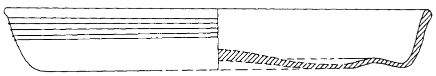
148. Bowl

Colorless, applied decoration in blue
H. 1.9 cm; Diam. 13.8 cm
10th century
1939; Tepe Madraseh, Y6
Discarded

Base and wall section of a bowl making possible a drawing. Shallow bowl; thickened base, kick in center. Flaring wall with four thin blue threads applied on the exterior and a blue thread around the rim.

For this type of decoration compare Lamm, *Glas von Samarra*, pl. 4, no. 262, pl. 7, no. 263. A footed bowl said to be from Iran and dated to the eleventh to twelfth century has the same decorative scheme, although the thread on the rim is missing (Qaddumi, *Variety*, p. 111).

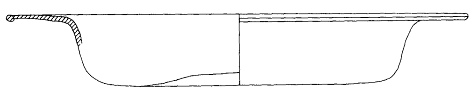
148



---

149. Fragment of a bowl

Colorless, applied decoration in blue
H. 2.6 cm; Diam. 17.4 cm
10th century
1939; Sabz Pushan, well in 9D
Discarded



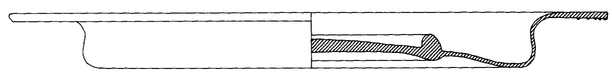
Base and wall section of a bowl making possible a drawing. Wide, flaring rim, blue thread applied to its exterior. Bowl's complete shallow shape reconstructed from the fragment.

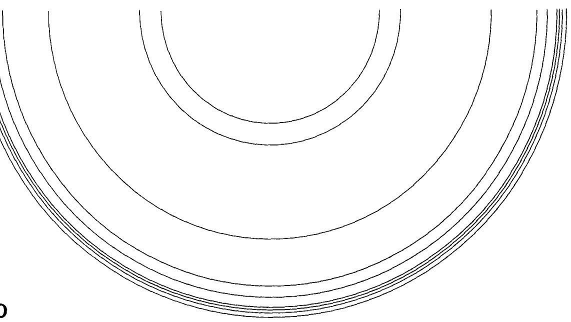
---

150. Dish

Colorless, applied decoration in blue
H. 2.4 cm; Diam. 26.6 cm
10th century
1939; Tepe Madraseh, well in Y6
Discarded

Base and wall section of a dish making possible a drawing. Shallow, flat dish. Base thickened in center, with kick. Large interior ring, but dish rests on thin outer part of base. Vertical wall flaring to a wide rim (3.5 cm). Four blue threads applied to underside of rim and a narrow one to outer edge of rim.





150

---

151. Goblet

Colorless, yellowish green tinge. Iridescence
H. 7.8 cm; Diam.: base 4.7 cm, stem 1.4–1.6 cm, bowl 6.2 cm
9th–10th century
1939; Village Tepe
MMA 40.170.451

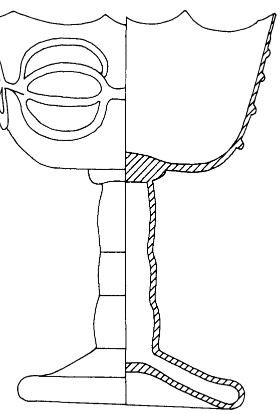
Cracked; upper part of bowl and rim missing. Assembled from three separately made parts: a slightly sloping footring folded around to create a base, with a pontil mark in center; a multi-knobbed stem topped by an additional glass glob; and a thin, flaring bowl with applied threads. Design on bowl in spectacle pattern, a frieze of circles overlaid by two additional threads.

For Roman examples of the so-called spectacle pattern see Clairmont, *Glass Vessels . . . Dura-Europos*, nos. 188–91, pl. 23, and Saldern, *Glassammlung Hentrich*, no. 90. A goblet that has been called Sasa-

nian and for which a fifth-to-sixth-century date has been proposed seems to be the only counterpart from Iran (Pinder-Wilson, "Islamic Lands," p. 115, fig. 139). It is closely related to the goblet from Nishapur, and thus it probably in actuality dates from the ninth or tenth century. The continuity of this pattern from Roman times on into the Islamic world is also demonstrated by the existence of numerous examples from Egypt, where a beaker-shaped lamp with the pattern, dated to the eighth century, was excavated in Fusṭāṭ (Scanlon, "Fusṭāṭ... Report 1965, Part I," p. 112, fig. 25, pl. 36). A spectacle-pattern goblet with a double-walled bowl, said to be from Egypt and probably of the eighth or ninth century, is now in Berlin (Museum für Islamische Kunst, I.1990.9), as is a fragment of Egyptian origin from the ninth or tenth century which has the design in emerald or dark green (lead) glass on colorless glass (I. 6674). For the decoration on bottles from Egypt see Soucek, *Islamic Art*, no. 34, and Jenkins, "Islamic Glass," nos. 8, 9 (eighth century). A variation on the pattern is seen on a goblet with a single thread pulled out and pinched downward, dated to the ninth century and from Iraq or Iran: see Keene and Qaddumi, *Selected Recent Acquisitions*, no. 31 (LNS 85 G).

Multi-knobbed stems from goblets have been common finds in excavations such as those at Seleucia, Ctesiphon, and Takht-i Sulaimān; see Kröger, *Parthisches... Glasfunde von Ktesiphon*, nos. 581–85. Usually all or most of the bowl is missing, and thus little is known about how the bowls of the goblets were decorated.

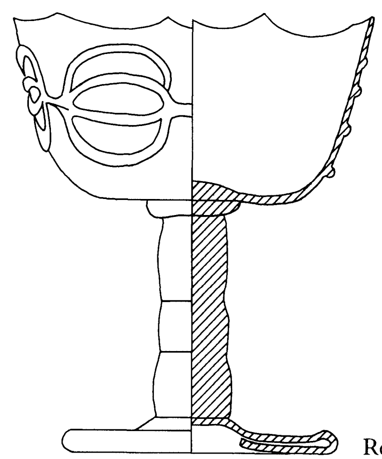
Note: The original excavators' drawing, picturing a hollow stem and base, is reproduced here, along with a corrected drawing. Stems of Islamic goblets are usually solid (see Kröger, *Parthisches... Glasfunde von Ktesiphon*, nos. 576–79).



Original drawing



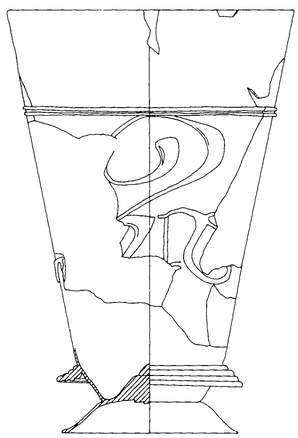
151



Revised drawing

152. Beaker

Colorless, applications colorless
H. 13.5 cm; Diam.: base 5.9 cm, rim 9.5 cm
11th century
1939; mound near Mashhad Road
Discarded



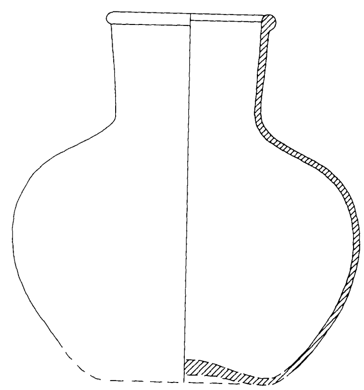
Broken, mended; numerous pieces missing, but fragments make possible a drawing. Footed beaker with flaring body and splayed ring foot. Kick-base, thickened, with pontil mark. Concentric threads forming a collar around lower body, twin horizontal threads marking off upper body. Uppermost wall undecorated. Central zone decorated with applied curlicues in virtuosic "brushstroke" style; fragments of only one side drawn, but a note on the drawing stating that a similar curling design was on reverse of vessel.

For footed beakers see *Glass... Smith Collection*, no. 495; "Recent Important Acquisitions," 1968, p. 185, no. 28; Saldern, *Glassammlung Hentrich*, nos. 325–26; Saldern, "Sassanidische... Gläser," pp. 57–59, fig. 15 (eighth–ninth century, with a related collar); Saldern, *Glas... Sammlung Hans Cohn*, no. 185. See also the footed bowl in Corning with a similar collar: Saldern, "Gläserner Schlangenkorb," fig. 5.

For a snake-thread motif in the form of volutes see Saldern, *Glas... Sammlung Hans Cohn*, nos. 188–89. The frieze may have been made up of repeating elements such as those on the ewer in Lukens, "Medieval Islamic Glass," fig. 13, and Jenkins, "Islamic Glass," no. 41, or the ewer in Jenkins, *Islamic Art... Kuwait*, p. 31 (LNS 43 G).

153. Bottle

Colorless, applications blue
H. 9.8 cm; Diam. 9.5 cm
10th century
1939; Tepe Madraseh, well in S7, just below top floor
Discarded



Section of vessel making possible a drawing. Globular body, kick-base. Slightly flaring neck with blue thread around the rim.

For similar but mold-blown bottles with a thread collar around the rim, see Saldern, *Glas... Sammlung Hans Cohn*, no. 172; Qaddumi, *Variety*, p. 115 (four patterned bottles of yellowish green glass with dark purple rim).

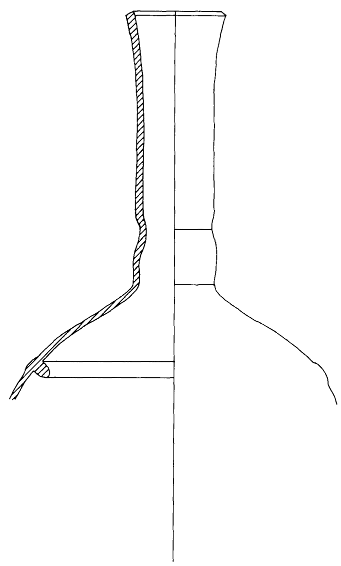
---

154. Fragment of a bottle

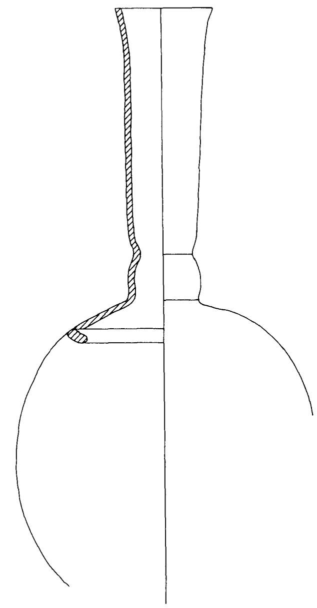
Colorless
H. 12 cm; Diam. of bottle 8.2 cm
10th century
1939; Sabz Pushan, well in 9D
Discarded

Upper part of a bottle making possible a drawing. Globular body with an interior ring around the shoulder. Cylindrical neck, drawn in at one point. Slightly flaring rim.

Interior rings that bear comparison are known from other types of bottles: see Billeter, *Glas*, p. 52 (inv. no. 1966–70); Kröger, *Glas*, no. 22. For a jug in Copenhagen with two interior rings see *Art from the World of Islam*, Humlebaek, no. 41. For examples from Corinth see Davidson, *Corinth*, p. 119, no. 781, p. 118, fig. 17. For bottles excavated in Dwin, see Janpoladian, *Medieval Glassware*, pls. 122, 122m, drawing pl. 15 : 12. For examples of European bottles of the thirteenth to fourteenth century see Baumgartner and Krueger, *Phönix*, pp. 266ff., nos. 296–302. Unless new finds show otherwise, there is little convincing evidence that Islamic glasshouses passed this feature on to European glass producers.



154



155

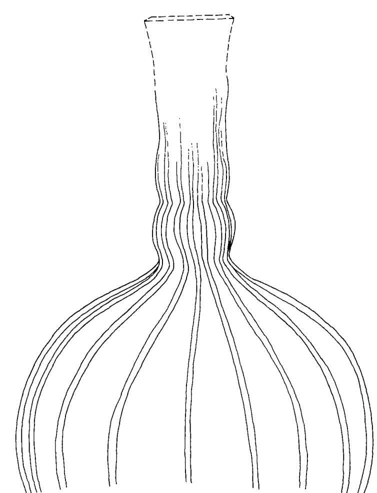
155. Fragment of a bottle

Colorless
H. 10 cm; Diam. of bottle 8.7 cm
10th century
1939; Sabz Pushan, well in 9D
Discarded

Upper half of a bottle making possible a drawing. Similar to Number 154.

156. Bottle

Colorless, green tinge
H. 11.5 cm; Diam. 10.5 cm
10th century
1939; Sabz Pushan, *zir-i-zamin* in 3X
Discarded



Upper part of a bottle making possible a drawing. Globular body, cylindrical neck with bulge and flaring rim. Regularly spaced vertical threads over body and neck.

For vertically applied but pinched threads see Kröger, *Parthisches... Glasfunde von Ktesiphon*, nos. 140–50 (Sasanian); Saldern, *Glas... Sammlung Hans Cohn*, no. 179 (ninth–tenth century).

157. Bottle

Colorless
H. 12 cm; Diam. 10.5 cm
10th century
1939; Sabz Pushan, *zir-i-zamin* in 3X
Discarded

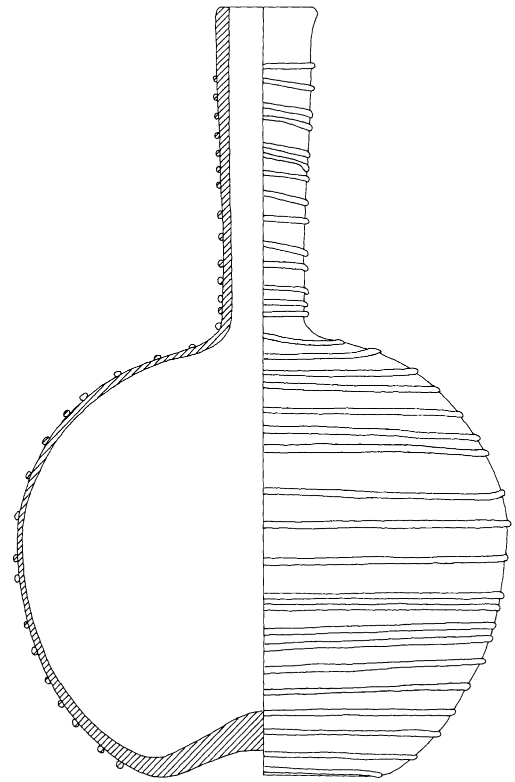
Upper part of a bottle. Similar to Number 156.

158. Bottle

Colorless, applications green with slight olive tinge
H. 18.2 cm; Diam. 12 cm
10th century
1939; Tepe Madraseh, W20
Discarded

Sherds making possible a drawing. Globular body, thickened kick-base. Cylindrical neck. Thread of green glass applied horizontally spiraling around the body and neck.

Compare the neck of a different type of bottle: Lamm, *Glass from Iran*, pl. 41A (ninth–tenth century). For a jug with body and neck covered by spiral threading see *Tribute to Persia*, Corning, no. 32. For a beaker fragment from the Ctesiphon region see Kröger, *Parthisches... Glasfunde von Ktesiphon*, no. 911. Compare also the neck of a bottle: Negro Ponzi, "Late Sasanian Glassware from Tell Baruda," fig. C, no. 632 (sixth century). A beaker in Jerusalem has spirals: see Hasson, *Early Islamic Glass*, ill. 9 (ninth–tenth century). This kind of simple decoration stands in a long tradition: see Saldern et al., *Gläser... Sammlung Erwin Oppenländer*, nos. 646, 648, for Roman bottles; Saldern, *Ancient... Glass from Sardis*, no. 790, for a neck of a bottle excavated in Sardis and dated to the eleventh to twelfth century. These examples show the continuous and widespread use of the decorative scheme.



158

159. Neck of a bottle

Colorless. Corrosion; slight iridescence
H. 9 cm; Diam. 2.2 cm; Th. at rim 0.2–0.4 cm
10th century
Excavation year and provenance unknown
MMA 48.101.260

Neck of a bottle similar to Number 158. Cylindrical neck, irregularly cut at rim. Thin thread (diam. 0.15 cm) applied horizontally spiraling around the neck.



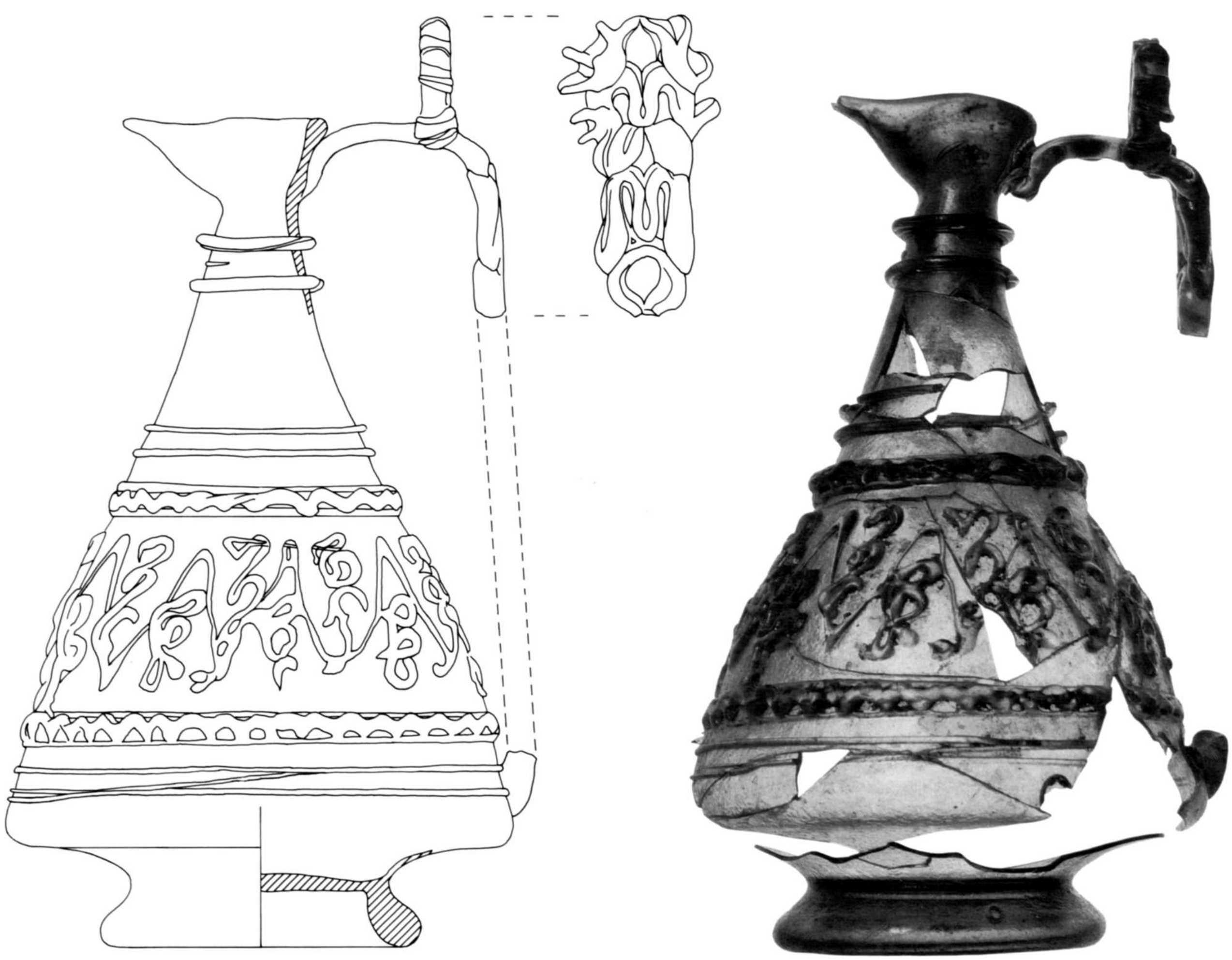
160. Pitcher

Colorless, greenish tinge
H. of vessel 16.2 cm; H. with handle and thumb-rest 18 cm; Diam. 10 cm
11th century, probably first half
1939; Qanāt Tepe, kiln E7 by AA2
Tehran, Iran Bastan Museum 4807

Broken, mended; many pieces of vessel and handle missing. Tapering body on ring base. Flaring orifice with pointed spout. Applied handle worked from many threads; large thumb-rest. Decoration applied to the body, a large frieze with zigzag pattern filled with irregularly curving threads in "brushstroke" style. Frieze framed by bands containing small zigzags and plain double threads.

References: Lacam, "Contribution," p. 24, fig. 7 (no mention of provenance; date given as 650–750); D. T. Rice, *Islamic Art*, pp. 212–13, ill. 217 (fourteenth century); Lukens, "Medieval Islamic Glass," p. 206, fig. 14 (first half eleventh century); Saldern, "Gläserner Schlangenkorb," p. 60 (ninth century); Abdul Khaliq, *Islamic Glass*, pl. 1 b.

A ewer with a less sophisticated decoration of applied threads was discussed some time ago in the context of the Nishapur ewer by Lukens in "Medieval Islamic Glass," pp. 205–6, fig. 13. Lamm, *Glass from Iran*, pl. 43A, shows a related fragment. For vessels with animals see Saldern, "Gläserner Schlangenkorb," fig. 5, and compare other vessels in the article that show a variety of applied decoration. The proposed dating seems too early. See also Abdul Khaliq, *Islamic Glass*,



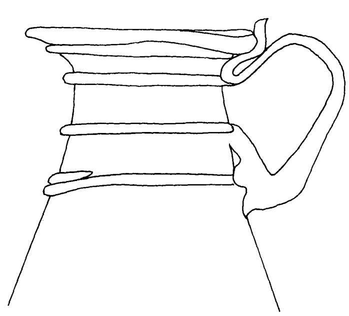
pls. 18, 19a. For applied threads in zigzag borders see Kröger, *Glas*, no. 138. For a group of ewers with colored threads in zigzags see Ricke, "Neue Räume," fig. 4, and Qaddumi, *Variety*, p. 110 (LNS 81 G). For a different type of ewer see Fukai, *Persian Glass*, pl. 76.

As R. W. Smith has noted, applied openwork thread handles probably derive from rock crystal and carved glass prototypes; see *Glass... Smith Collection*, no. 487; also Pope, "More about Persian Glass," p. 11, fig. 4; Lamm, *Glass from Iran*, pl. 40 D (grille of unknown use); Jenkins, *Islamic Art... Kuwait*, p. 31 (LNS 43 G). For a large handle of a ewer in relief-cut style, see *Glass... Smith Collection*, no. 583. See An Jiayao, "Dated Islamic Glass," p. 130 and fig. 13, p. 131 for a jug 17 centimeters in height, with a similar handle, from the tomb of Princess Chenguo; it can be dated to the early eleventh century and thus provides a time frame for the Nishapur vessel. It is noteworthy that the jug has applied blue threads on the rim, recalling the plates Numbers 148–150 and the bottle Number 153.

---

161. Fragment of a pitcher

Pale greenish
H. 4.5 cm; Diam. 5 cm
10th century
1939; Sabz Pushan, *zir-i-zamin* in 3X
Discarded



Uppermost part of a pitcher, making possible a drawing. Tapering with spouted orifice. Handle applied from neck to rim. Decoration consisting of threads applied in horizontal rings.

Millefiori Glass

The glass technique called millefiori (thousand flowers) is among those not well represented in the excavation finds. Except for a single game piece unearthed during a trial dig in South Horn (the only glass find recorded at that site), not a single millefiori fragment was found at Nishapur. The game piece was made from thick glass within which cylindrical slices of millefiori glass were fused. The slices came from bundles of red, yellow, and green glass canes fused together. The final shape of the piece, with the central knob at the top, seems to have been achieved by polishing.

Millefiori glass is well known from the Hellenistic and Roman periods. As the excavations at Ctesiphon, Samarra, and Susa demonstrate, its manufacture continued in Iraq and Iran during the Sasanian and early Islamic periods. There are numerous other examples among the finds from uncontrolled excavations. Vessels (particularly bowls and the characteristically Islamic molar flasks), game pieces of various shapes, and tiles show that this technique was extremely popular in early Islamic times.

The single game piece does not constitute proof that millefiori glass was made in Nishapur. However, there is no reason why a major glass-manufacturing center should not have produced glass of this type. The piece cannot be assigned an exact date.

162. Game piece

Dark gray (corrosion?); circular insets of millefiori glass of red, yellow, and green
H. 2.8 cm
9th–10th century
1937; South Horn
Tehran, Iran Bastan Museum 20535



Complete. Solid glass with millefiori inserts. Flat circular base, tapering body with small knob at top.

For the widespread use of different kinds of millefiori glass in the early Islamic period see Lamm, *Glas von Samarra*, pp. 109–10, nos. 304–12, pls. 8, 9 (millefiori tiles); a fragment in color is shown in Jenkins, "Islamic Glass," no. 75. A variety of millefiori glass vessels are known: see Lamm, "Verres . . . à Suse," pp. 366–67, pl. 79:10; Lamm, *Glas von Samarra*, p. 108, pl. 12, no. 303; Pinder-Wilson and Scanlon, "Glass . . . Fustat: 1972–1980," no. 19, fig. 19; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, no. 211 (identical with Clairmont, "Some Islamic Glass," p. 144, no. 5). See also *Glass . . . Smith Collection*, no. 484; Kröger, *Glas*, nos. 140–41.

The game (chess, backgammon, or another board game) in which this piece was used cannot now be identified. For a closely related game piece, a millefiori glass chess piece of cylindrical form with a knob, decorated with green, mustard yellow, and cream canes in a floral pattern, see *Islamic Works*, Sotheby's, no. 70. For simple game pieces see Kröger, *Glas*, no. 143; Hasson, *Early Islamic Glass*, p. 21 and ill. 37; Jenkins, "Islamic Glass," nos. 62–65; Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, no. 224. The game pieces are usually tapering.

A shape with a central knob at the top seems to have been common in glass. Finds of similarly shaped stone pieces from Nishapur may also be cited (e.g., MMA 38.40.265, from Sabz Pushan), and two only slightly larger metal objects, of domed cylindrical form with a knob at the top, were made to be used as weights (Allan, *Nishapur: Metalwork of . . . Islamic Period*, nos. 129–30).

Luster Glass

A single fragment of a small beaker painted in a brown color on the interior was found in 1938 during the excavations at Tepe Madraseh, in the "vestibule" (G2) of the prayer hall. It was the only glass find from this findspot and the only find of its type. Some confusion has arisen, however, because of a statement that "some further fragments of similar character were found at Nishapur recently" (Heaton, "Origin," p. 10 n. 1). The idea seems to have been taken up by Wilkinson, who mentions "fragments of glass bowls decorated with patterns in silver stain" (Wilkinson, *Nishapur:... Buildings*, p. 56). It is nonetheless the case that only one fragment was photographed during the excavations, and I have uncovered no sign of anything beyond this one fragment, Number 163.

The sherd seems to belong to a small cylindrical beaker with a slightly rounded base. The fragment is extremely thin-walled and has a small pontil mark in the center. No other examples of this type of vessel occur among the finds. The glass, a light blue green which can also be called aquamarine, is nearly colorless. (Several versions of very light bluish green glass emerged in the excavations.) The interior was painted with a starlike pattern in which four double-line arms, alternating with single lines, radiate from the center. At certain points the double lines were connected by short cross-lines. The design was painted on the glass, probably with a brush, in a rather cursory style.

Shortly after its discovery the fragment was given by Charles Wilkinson to Noël Heaton, who examined it to determine whether the brown painting was silver stain. Heaton reported: "I carefully removed a minute portion of the surface with hydro-fluoric acid and subjected it to micro-chemical analysis, when I obtained a definite reaction for silver. This established beyond doubt that the colour was due to silver stain" ("Origin," p. 10). The fragment may thus be described as luster glass, although the brown color does not show the lustrous appearance usually seen on luster-painted glass. However, variations in color quality and in shade, ranging from light to dark brown, characterize this kind of painting.

The development of chromatic surface techniques, among them luster painting, is a much debated subject of which the history has yet to be written. A glass cup found during the excavations in Fusṭāṭ carries an inscription that dates it to the reign of the governor ʿAbd as-Ṣamad ibn ʿAlī, who ruled Egypt during the second half of the eighth century (Pinder-Wilson and Scanlon, "Glass... Fustat: 1964–1971," fig. 41, no. 23)—leaving no doubt that luster painting was already being practiced in Egypt at that time. Luster painting on glass seems to have spread rapidly through the Islamic world and neighboring regions; many vessels or fragments are described as coming from Egypt, Syria, Iraq, Armenia, and Iran. The technique may well have been practiced in many of these lands.

The color of glass of Number 163, although unique in the excavation, occurs in examples from the art market, a number of them said to be from the Nishapur region (see also appendix 3, the category "uncolored" aqua glass). The color is very common for Islamic luster-painted glass; "transparent base glasses decolorized or tinged with the characteristic aqua or pale greenish colors produced by iron" were used (Brill, "Chemical Studies," p. 354). Although the vessel type cannot be known with certainty, the piece could have been a small beaker—a shape that seems to have been used with pale aqua luster-painted glass in Egypt (Honey, *Glass*, pl. 16D). It is possible that the shape came to Nishapur with the technique. The sherd's simple pattern has much in common with the decoration of simple radial lines that appears on Nishapur pottery of the ninth to tenth century and shows the same carelessness in drawing typical for the pottery—another argument for the fragment's Nishapur origin (Wilkinson, *Nishapur: Pottery*, p. 31, nos. 3, 4, p. 43, no. 55).

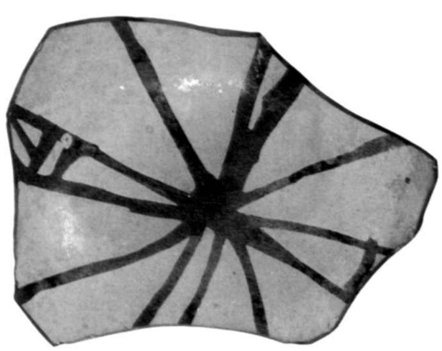
Even though excavations have shown that luster painting was not practiced on pottery in Nishapur—the few sherds of lusterware found there are most likely imports (Wilkinson, *Nishapur: Pottery*, pp. 181–82)—the evidence just

adduced suggests that glass with luster painting was manufactured in Nishapur. Without further excavations, greater certainty is not possible.

A number of luster-painted fragments known from the art market are described as coming from Nishapur, among them two fragments in Berlin (see Klein, *Islamische Keramik*, no. 20). These are of dark blue glass and colorless glass and are painted, respectively, in a yellow tone and a brown tone. They show painting on both exterior and interior, a common feature (see Lamm, *Mittelalterliche Gläser*, p. 109, colorpl. B1, pl. 34:4). Painted glass, whether it can be called luster or not, had widespread use. Besides the finds from Samarra, Dwin, and Takht-i Sulaimān, the most spectacular piece is a bowl from the Famen Temple in China which can be dated to before A.D. 874. The bowl illustrates very clearly the superb quality that painted glass can attain (see An Jiayao, "Dated Islamic Glass," p. 129, fig. 10).

163. Fragment of a beaker(?)

Aquamarine; brown paint. Slight iridescence
L. 5.2 cm; Th. 0.12 cm
9th–10th century
1938; Tepe Madraseh, "vestibule" (G2) of prayer hall
MMA 40.170.675



Fragment of the base of a small vessel, possibly a beaker. Kick in center, small pontil mark (diam. 0.9 cm). On the inside, painting in brown color; pattern of lines joining at center of base.

References: Heaton, "Origin," pp. 10, 11, fig. 1; Wilkinson, *Nishapur: . . . Buildings*, p. 56; Charleston, "Glass," p. 302.

For fragments of painted glass, see Lamm, *Glas von Samarra*, pls. 7, 8, nos. 271–74; Janpoladian and Kalantarian, *Trade Relations*, no. 70. There are a number of unpublished fragments from the excavations at Takht-i Sulaimān in the Museum für Islamische Kunst in Berlin.

Vessels with Incised Decoration

The technique of decorating glass by incising the surface with a hard stone point was known throughout the Roman world. However, there do not seem to be any finds from Iran securely datable to the Sasanian period; incised glass, also called scratch-decorated glass, apparently did not achieve popularity there before the early Islamic period.

The Nishapur excavations yielded fragments of two vessels in this technique, Numbers 164 and 165, one from Tepe Madraseh and the second from an unknown location. They seem to have been very similar vessels, large, shallow plates slightly curved toward the rim. The first is of dark blue glass; a colorless yellowish green–tinged glass was used for the second. Number 164, as the fragments reveal, rested on a pedestal foot. Nothing comparable has been excavated at Nishapur, but plates with pedestal feet are known in other mediums. Such a vessel was even depicted on the wall of a bathhouse in Qanāt Tepe (Fig. 7), where it is shown being used as a fruit dish (see Wilkinson, *Nishapur:... Buildings*, p. 276).

The fragments reveal similarities of decorative method as well as of form. On both plates the surface was closely decorated with elaborate patterns, leaving little plain background. Some motifs stand on a hatched ground, while others are themselves hatched. On both plates concentric borders containing braidlike motifs framed a main frieze. The main frieze of Number 164 had compartments filled symmetrically with leafy plants, either scrolled or spread out to the corners, alternating with panels divided into three triangles each filled with a single plant design or with lozenges. The similarities in shape, design, and execution between the fragments of the two plates suggest that they were manufactured in the same workshop. Whether that workshop was in Nishapur or in another Iranian city is a question that cannot yet be answered.

A fragment of an incised vessel has been excavated in Susa, and numerous such finds are known from other major cities of the Islamic world. In Iraq the excavations in Samarra yielded a number of fragments of colored vessels, possibly cylindrical beakers or small plates, with incised decoration. In Syria and Israel finds are known from Raqqa, al-Mīnā, and Nessana. Fragments from Fusṭāṭ in Egypt were dated to

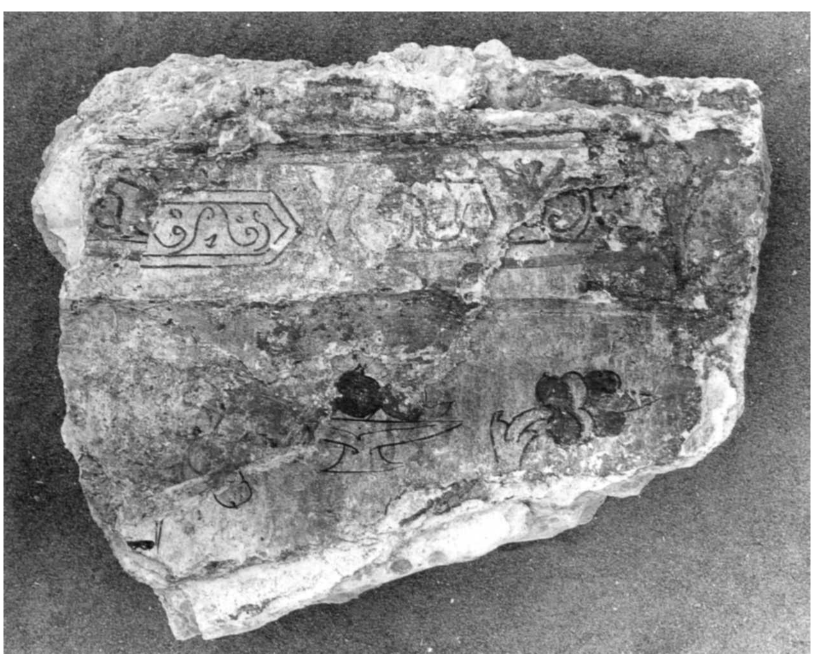


Figure 7. Painting on plaster showing a dish of fruit. From the bathhouse at Qanāt Tepe, Nishapur. New York, The Metropolitan Museum of Art (39N252)

the ninth century (Scanlon, "Fusṭāṭ... Report 1968," p. 84, pl. 32, fig. 5b). These fragments are usually of colored glass because the incised design, which appears white, achieves its best effect against a dark ground. Amber and dark blue are often-used colors.

In addition to fragments found during excavations, numerous vessels without exact provenances are known. Among these, fragments of bowls collected by R. W. Smith and now in the Corning Museum are close parallels to the Nishapur finds in their use of geometrical ornament and naturalistic plant forms. A chemical analysis of Number 164 and two of the Corning fragments shows that they are virtually identical (see appendix 3). The Nishapur finds and these fragments stand apart from the other examples, which are rather crudely incised, even those from Samarra. As Robert Charleston has noted, the decoration of the plate Number 164 "shows a degree of elaboration and sophistication which is unrivalled" among the other finds of incised glass. Charleston also mentioned a possible relation between the incised decoration and the motifs of Mesopotamian lusterware of the ninth century (Charleston, "Glass," p. 302); the link suggests a ninth-century date for the Nishapur fragments. Wilkinson proposed an early-ninth-century date for the low level in which the fragments of Number 164 were found.

But for dating, the most important evidence is provided by plates from the crypt of the Famen Temple in China, which was sealed in A.D. 874. Six shallow plates of dark blue glass with an irregular bottom and slightly splayed rim were uncovered in the crypt. They vary in height from 2.1 to 2.3 centimeters and in diameter from 15.7 to 20.3 centimeters; thus they are somewhat smaller than Number 164. All six have different incised patterns, and two of them show gilding in the incised lines (An Jiayao, "Dated Islamic Glass," pp. 123–24, figs. 3–8). The six plates carry decorative elements identical to those in Numbers 164 and 165, such as diaper, cable, and border patterns, and both groups incorporate a five-petaled leaf.[1] Thus it is possible that the plates from China and the two Nishapur plates came from the same workshop. The ninth-century date assigned by Wilkinson to Number 164 is corroborated by these new finds. (Compare also the remarks by Robert H. Brill in appendix 3.)

The question of provenance for incised glass cannot be answered with certainty. However, since incised glass has been found in every major center, probably it did not all originate in a single location. It seems more likely that incised glass was made in local glasshouses, where a technique and an analogous style prevailed that were common to most glass-producing centers in the Islamic world. Therefore there is no obvious reason why the Nishapur plates should not have been blown and incised in Nishapur.

On the other hand, perhaps the situation is comparable to that of luster pottery. Only a few bits of luster pottery were found in the excavations, and luster pottery was not made in Nishapur, so those few examples must have been manufactured in a center where luster pottery was made. The possibility should not be entirely ruled out that these incised glass plates were imported from Iraq in the same way. That glass of this type was exported is demonstrated by the finds from China.

1. Robert H. Brill has suggested that the five-petaled leaf resembles that of the hemp plant, *Cannabis sativa*; see Brill, "Glass and Glassmaking," p. 63, n. 14.

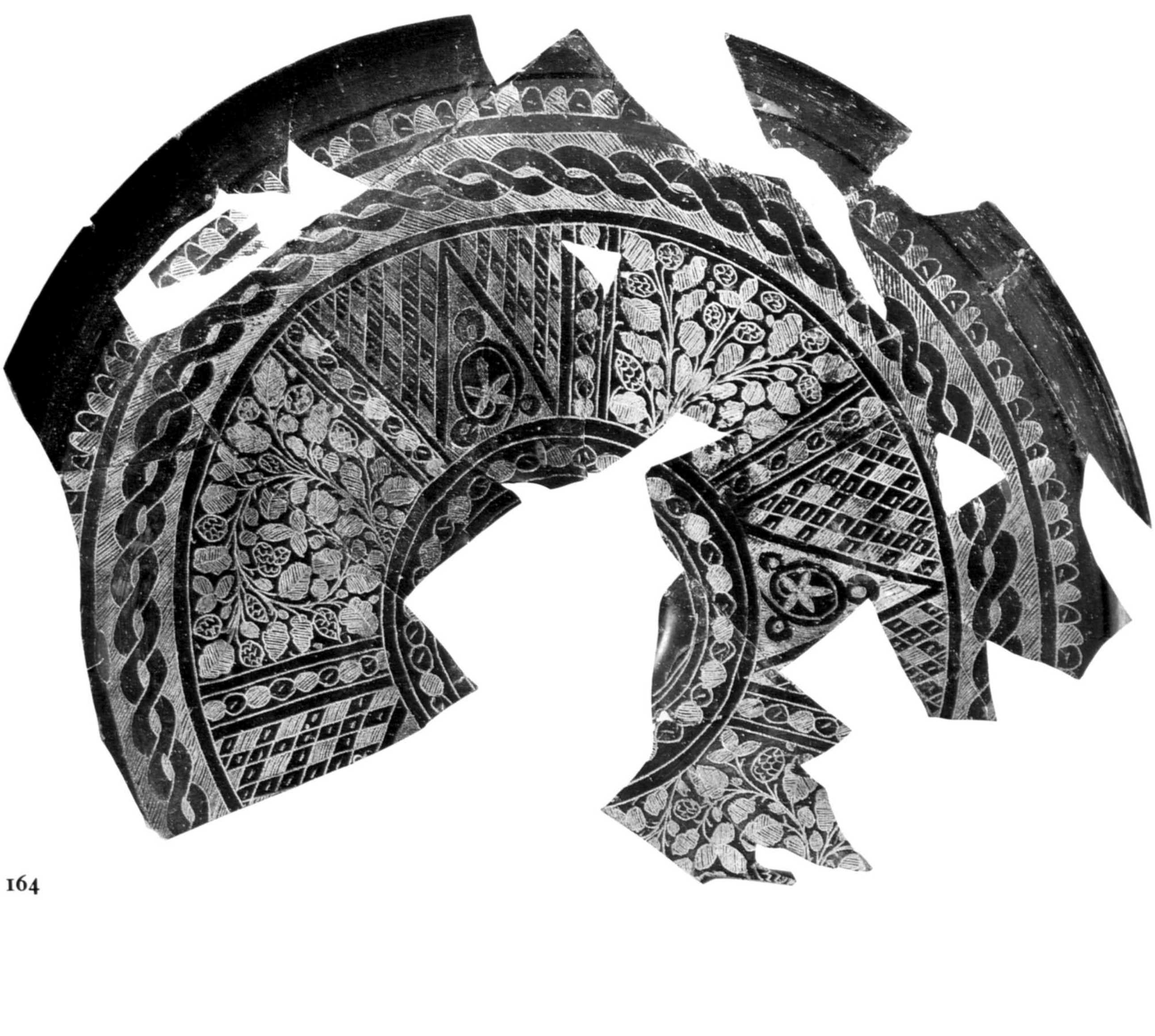
164. Part of a plate

Dark blue
H. 1.5 cm; Diam. 28 cm
9th century
1939; Tepe Madraseh, well in annex of W4, low level, below gatch
MMA 40.170.131

Broken, mended; foot and much of the rim section missing, now restored. Large plate with shallow body, rim thickened and turned up. Originally with a foot, probably of splayed pedestal shape. Incised circular frieze between braidlike borders consists of panels filled alternately with large plants and with a triangle containing a small plant scroll flanked by areas of lozenge pattern. Hatching used to set off either pattern or ground.

References: Hauser and Wilkinson, "Museum's Excavations," pp. 105–6, fig. 33; Charleston, "Glass," p. 302 and pl. 14; An Jiayao, "On Early Islamic Glasses," p. 1119; An Jiayao, "Dated Islamic Glass," pp. 123–24.

For incised glass found in excavations see Lamm, "Verres... à Suse," p. 366, pl. 77:2. A fragment of a cylindrical beaker from Susa with incised decoration has been dated to the first half of the eighth century (Hardy-Guilbert, "Niveaux islamiques," pp. 143, 196–97, fig. 32:1, pl. 67), while another small fragment of blue glass is given a ninth-century date (Kervran, "Niveaux islamiques," 1984, pp. 218–19, fig. 8:19). For two fragments from Iraq see Abdul Khaliq, *Islamic Glass*, figs. 33, 34, pl. 4h. See also Lamm, *Glas von Samarra*, pp. 79–82, pl. 8; Janpoladian and Kalantarian, *Trade Relations*, pl. 27:15 (Dwin); Lane, "Medieval Finds," pp. 67–68, fig. 12G (al-Mīnā); al-ʿŪsh, "Incised... Glass," pp. 200–203 (Raqqa); Harden, "Glass," *Excavations at Nessana*, p. 80, pl. 20:20 (Israel). Clearly, excavations have yielded numerous finds over a large area. For incised finds from unknown sites see Lamm, *Mittelalterliche Gläser*, pp. 139–41, pls. 50, 51; *Glass... Smith Collection*, nos. 604–6; Clairmont, *Benaki Museum*, nos. 254ff.; *3000 [Dreitausend] Jahre*, no. 585; Kröger, *Glas*, no. 146; Jenkins, "Islamic Glass," p. 18, no. 15; "Recent Important Acquisitions," 1969, no. 20. For related decoration on luster pottery (already pointed out in Hauser and Wilkinson, "Museum's Excavations," pp. 105–6, fig. 33), see Sarre, *Keramik*, nos. 156–57, pl. 13, p. 42, pl. 17:5–10; *Excavations at Samarra*, pls. 92–98, especially pl. 97 top; Klein, *Islamische Ker-*



164

amik, no. 32; Lane, *Early Islamic Pottery*, pl. 10; Kühnel, "ʿAbbāsidischen Lüsterfayencen," pp. 149–59, especially p. 155, fig. 3. The ceramics found during the Nishapur excavations show no real relation to incised glass. For lozenges see Wilkinson, *Nishapur: Pottery*, p. 39, fig. 39.

For a glass plate with a pedestal foot see Lamm, *Mittelalterliche Gläser*, pl. 1:20 (drawing); Blair, *History of Glass*, p. 391, no. 108. A small bowl with a kicked-up pedestal foot was excavated in Fusṭāṭ: see Pinder-Wilson and Scanlon, "Glass... Fustat, 1964–1971," no. 1, fig. 1–2 (dated to the ninth century). This kind of foot was also known in Samarra, though it is not known precisely to what type of vessel it belonged; see Lamm, *Glas von Samarra*, fig. 8, no. 32. Ultimately the pedestaled plate shape was derived from Sasanian silver and bronze plates, undecorated or with decoration on the interior: see Harper, *Royal Hunter*, no. 9 and fig. D on p. 86.

---

165. Fragments of a plate

Colorless. Extensive iridescence
L. 6 cm; Th. 0.2 cm
9th century
Excavation year and exact provenance unknown
MMA 48.101.278a-b

Two joining fragments of a large plate with incised decoration similar to Number 164. Shows parts of concentric borders with braid and zigzag patterns, similar though not identical to decoration of Number 164.



Vessels with Wheel-Cut Decoration

Sixty-three wheel-cut vessels or vessel fragments were found at Nishapur, the largest group of finds decorated in any one technique. It is best to divide these wheel-cut glass finds into different subgroups based on pattern, shape, or style. Vessels with facets (Numbers 166–173) and those with disks (Numbers 174–185) are two groups differentiated by their patterns. Molar flasks (Numbers 186–189) constitute a group clearly defined by shape. Other vessels fall into groupings defined by stylistic differences: vessels with relief-cut decoration and vessels decorated in distinct styles here called linear, intermediate, and slant-cut. Each of these groups shows characteristic types of decoration executed by particular methods of wheel-cutting.

Wheel-cut or wheel-engraved glass was worked with a rotary, abrasive-fed tool which was applied to the glass after it had been free-blown or mold blown, and thus belongs in the category of cold-worked decoration. The tool was used to engrave patterns into the glass surface or to grind down or cut away part of the glass surface to alter the shape of the original blown vessel (Charleston, "Wheel-Engraving," pp. 86–87). "As far as we know, hollow and relief cutting was carried out by means of the bow drill. This consisted of a fixed spindle to which were attached the appropriate discs—a fine cutting edge for incised work and a broader edge for grinding. The drill was rotated by the backwards and forwards movement of the bow while the glass was held against the wheel, which was provided with necessary abrasive. The final polishing was also carried out on the wheel" (Pinder-Wilson, "Islamic Lands," p. 119).

With relief-cut decoration, a large part of the surface of the glass is ground away, so that the design stands out in relief against the background and there are two clearly defined planes. With the linear style, the design is achieved by engraving grooves that cut below the surface, also called hollow-cut grooves; the engraved outlines thus contrast with the plain surface. For designs in the intermediate style, thinner or thicker hollow-cut grooves are used, sometimes together with outlines cut at a slant. This style is also called intaglio engraving (Charleston, "Glass," pp. 299–302). Vessels decorated in the linear and the intermediate styles involve less labor than other wheel-cut decorations and probably were priced more modestly than relief-cut or slant-cut glass. On vessels decorated in the slant-cut style, the individual motifs of the design are delineated by outlines cut on a slant. The surface is crowded with designs, leaving little or no vacant background.

Affinities to glasswork of the Sasanian period are evident among examples of wheel-cut glass with relief decoration, especially those with facets and disks. These are the vessels that clearly show that Islamic glassworkers in Iran stood in the Sasanian tradition.

Certain types of high-quality glass are scarce among the finds: for instance, there are few examples with relief-cut motifs like the plant designs on Numbers 194–196. This may be merely a matter of chance, but it is also possible that glassware of this type was produced in only modest quantities because there was not a large market for it in Nishapur. Since the overall number of finds is limited, it cannot be definitively ascertained whether relief-cut glass was equally popular in both the ninth and tenth centuries or whether it was in greater use in the ninth century.

The role played by the linear style is difficult to assess, since only a few examples in this style were found at Nishapur. A number of finds are in the intermediate style, which seems to be transitional between the relief-cut and linear styles and the slant-cut style. The existence of many finds of slant-cut glass shows that the technique became increasingly popular and was probably the dominant style of the tenth century.

The finds from Samarra show that glass vessels worked in the relief-cut, linear, and slant-cut techniques were already in fashion in ninth-century Iraq. Thus, generally speaking, the different wheel-cut techniques must be regarded as contemporaneous. But each group underwent gradual changes in style and in patterns of use.

Relief-cut glass seems to have been more popular in Nishapur at the time of the earliest levels of occupation. Finds excavated from a tenth-century drain in room H4 in Tepe Madraseh are all in the intermediate and slant-cut styles. However, this findspot may also have yielded the facet-cut beaker Number 167.

Wheel-cut finds are mainly from Tepe Madraseh, with some other examples from Sabz Pushan and Qanāt Tepe. The glass used is mainly colorless; a few exceptions have a yellowish or greenish tinge. Among the sixty-three finds fifty are of colorless glass, only one is light green, and two molar flasks are emerald green. Two fragments are dark blue. The numbers show quite clearly that colorless glass was extremely popular during the ninth and tenth centuries and must be regarded as the standard color for wheel-cut glass. Indeed, it seems to have been so common that one may wonder whether it should be regarded as particularly special. It is only when viewed in the context of undecorated glassware (Nos. 1–113) that colorless glass seems something other than commonplace, since undecorated tableware was more often colored than colorless.

The shapes of the wheel-cut glass finds are of some interest. The type of bowl with a hemispherical bottom, known from the Sasanian period, appears at Nishapur only in this wheel-cut group. The same is true of the shallower segmental bowls, such as Number 166, which again have roots in the Sasanian period. It seems that vessels of different shapes were commonly worked in different techniques. Perhaps certain decorative motifs were applied only to specific types of vessels. That would explain why hemispherical-bottomed bowls are found only with disks and shallow, segmental bowls only with facets. The situation is different with bottles: typical bottles with a flaring body, tapering neck, and flat rim have been found both with and without decoration (compare Nos. 108, 109 and Nos. 171, 172, 227). Perhaps it is only by chance that the Nishapur excavations have not unearthed a ewer with a pear-shaped body in the relief-cut technique, a type of which a number of important examples are known, such as the Buckley ewer (Pope, *Survey*, pl. 1441; K. Erdmann, "Opere Islamiche," pl. 100, center right); or one in the cameo technique, such as the Corning ewer (Goldstein et al., *Cameo Glass*, fig. 13; Whitehouse, "Corning Ewer," figs. 1–5), which in theme and style seems to be an Iranian work.

Perhaps the single most typical shape for wheel-cut glass is the flaring beaker, a shape not found among the undecorated vessels. At least nineteen beakers or fragments of this type were found. This kind of beaker was employed in two standard sizes: the common beaker has a height between 10 and 11 centimeters, and a larger version reaches 14.5 to 15.5 centimeters. The foot is usually slightly thickened and the flaring wall extremely thin. Most beakers do not seem to have a smoothed rim, and not a single example was found with a thickened rim. Is this an indication that the beakers were not used as drinking glasses? At the moment there is no way of knowing. It should be borne in mind, however, that with their delicate walls, these beakers were no doubt extremely fragile.

The flaring beaker shape seems to have come into widespread use in the ninth century. The type has been found at a few sites: Samarra (*Excavations at Samarra*, pl. 121, top), Dwin (Janpoladian, *Medieval Glassware*, pls. 42ff.), and Sabra (Marçais and Poinssot, *Objets kairouanais*, pls. 56, 61). There are also many examples from the Serçe Limanı shipwreck (Kitson-Mimmack, "Glass Beakers," passim). It is evident that in the tenth century this type of beaker was used all over the Islamic world.

Except for the beaker Number 202, cylindrical beakers have not been found with decoration in the predominantly tenth-century slant-cut technique. However, they do exist with relief-cut and linear-style decoration. It is likely that cylindrical beakers gradually went out of fashion during the tenth century and were replaced by flaring beakers.

Quite often, wheel-cut vessels have a decorated base. Usually the pontil mark is smoothed, and sometimes a linear decoration is engraved around it. The decoration may be in the shape of a circle (Nos. 172 and 217, a bottle and a beaker), a triangle (Nos. 208 and 223, beakers), or a

square (No. 171, a bottle). A circle, multiple circles, and a square are motifs that seem to have been widely used; similar examples may be cited from Iran (Harden et al., *Masterpieces*, no. 139; Kröger, *Glas*, nos. 174, 181, 191) and from the Serçe Limanı shipwreck (Kitson-Mimmack, "Glass Beakers," pp. 79ff., fig. 16 [BK 32], pp. 99ff., fig. 21 [BK 45], p. 128, fig. 27 [BK 60]). Only miniature vessels were engraved with an X form (No. 176; compare Kröger, *Glas*, no. 161). On some vessels the base is more fully treated and integrated into the decoration of the whole. The base of the beaker Number 167 displays a round facet in the center at the place of the pontil mark and four additional facets around it. The base of the bottle Number 225 is even more elaborately decorated, and the pontil mark has been completely removed.

On the vessels Numbers 191 and 192 the base has been completely integrated into the larger design of the vessel. These exemplify a somewhat different approach, typical only for the relief-cut group. A number of analogous examples can be cited (compare Fig. 9, p. 141, and Kröger, *Glas*, nos. 179, 193). The practice of completely integrating the base into the design may ultimately descend from the tradition of Sasanian wheel-cut glass, in which the outsides of some vessels are entirely decorated (Charleston, *Masterpieces*, pls. 24, 25).

Vessels of all groups and styles except the linear style generally show a base decoration. However, finely decorated vessels in the linear style may also have a decorated base (Kröger, *Glas*, no. 191). Despite partial information—I have not been able to examine all the glass finds from the excavation, many finds are in a fragmentary state, and few vessels from the art market are published with a drawing of the base—it seems clear that the decorated base is a sign of quality. It also served a practical purpose: removal of the remains of the pontil mark allowed the vessel to stand properly and prevented the mark's sharp edge from causing injury.

In the course of the gradual stylistic transformation that led from the relief-cut style to the slant-cut style, the decoration of the base also changed. The concept of an integrated base whose decoration was a continuation of the pattern or design on the vessel gave way to a simpler idea in which a circle was engraved over the pontil mark and surrounded by a square, circle, or other plain shape. This simple treatment also appears among the finds from Serçe Limanı, and one may speculate whether this fashion spread from Iraq and Iran to the western parts of the Islamic world.

A number of styles that occur on wheel-cut glass from the art market are not represented or are only badly represented among the finds from the Nishapur excavations. They include relief-cut work in which the relief is relatively high and carries partly stylized plant motifs. This style is known from a cylindrical beaker in the British Museum (Pinder-Wilson, "Cut-Glass Vessels," pp. 37–39, pl. 17) and two bowls, one in the Victoria and Albert Museum (Charleston, "Glass," p. 302, pl. 12) and the second in a private collection (*Art from the World of Islam*, Humlebaek, no. 16). Only one fragment, Number 194, raises the possibility that this style was known in Nishapur in the ninth and tenth centuries. Also without parallel among the excavation finds is a superb boat-shaped vessel with spirals in a very high relief (*7000 Years*, no. 602; Schlosser, *Alte Glas*, pp. 62–63, fig. 51). Nor is cameo glass represented, although a number of vessels in very different styles show that this sort of glass was made throughout the ninth and tenth centuries (Goldstein et al., *Cameo Glass*, pp. 30–35) in Iraq and Iran, perhaps in Nishapur as well. Found side by side at Samarra were quite crude examples (Lamm, *Glas von Samarra*, no. 187, pl. 5, nos. 268, 270, pl. 7) and refined pieces (ibid., no. 249, pl. 8). The Corning ewer (Whitehouse, "Corning Ewer," p. 56) seems, on the basis of its decorative theme and details of the decoration, to be one of the later examples of Iranian cameo glass, perhaps dating from the end of the tenth century. A number of cameo glass vessels in the Nasser D. Khalili collection (to be published by Sidney M. Goldstein) suggest that this technique was more widespread than has hitherto been recognized and was a means for the production of outstanding works of art.

FACETED VESSELS

This group comprises eight vessels or vessel fragments decorated with facets. The finds are mainly from Tepe Madraseh; two pieces are from Qanāt Tepe and Sabz Pushan. The glass is colorless or has a greenish or yellowish green tinge.

The vessels found are of various shapes: a shallow bowl (No. 166), a flaring beaker (No. 167), a miniature jar (No. 168), a jug (No. 169), and three bottles and the fragment of a fourth (Nos. 170–173). Facet cutting was clearly used with a wide range of vessel types.

The facets may be round, oval, square, or in the shape of a parallelogram. Their cutting varies from shallow to rather deep. Sometimes facets cover the entire surface of the vessel, sometimes they decorate only a part. Round and oval facets are used to decorate large surface areas, while square facets occur only on the necks of bottles.

The popularity of facet cutting did not extend beyond the early Islamic period—up to about the late tenth or early eleventh century—and was greatest in the eastern part of the Islamic world. The style must be seen in connection with the fashion for facet cutting in the Sasanian period, which in its turn goes back to a practice of the imperial Roman period, as the finds from Dura-Europos demonstrate (Clairmont, *Glass Vessels... Dura-Europos*, passim).

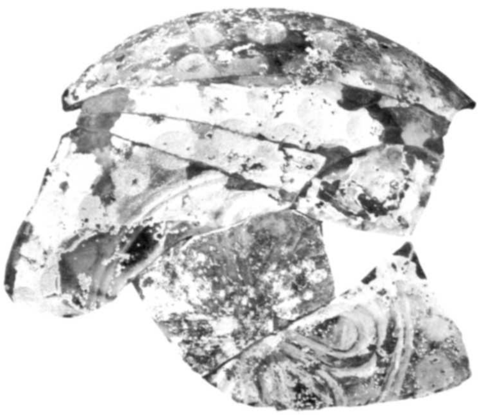
Sasanian vessel types that were primarily decorated by facet cutting, such as hemispherical-bottomed bowls, flaring beakers, and bottles of different sizes (Saldern, "Achaemenid... Glass"; Kröger, *Parthisches... Glasfunde von Ktesiphon*, nos. 170–206; Harper, *Royal Hunter*, nos. 76, 78, 79, 82), are not the same ones that were popular in early Islamic times. New vessel shapes appeared and patterns of decoration changed. It is noteworthy that the Sasanian hemispherical bowl did survive, transformed: a bowl of this shape with a decoration of disks was found (No. 182). But this is a single piece, and it is difficult to assess its importance.

The few examples found in the Nishapur excavations represent only a small part of the actual range of facet-cut designs, a range known largely from uncontrolled diggings in various parts of the Islamic world. A large number of bottles exist on which, unlike on those excavated in Nishapur, facets cover the whole body (Kröger, *Glas*, no. 185; Harden et al., *Masterpieces*, no. 139; Sugiyama, *Ancient Glass*, no. 220). Another group of facet-cut bottles from Iran displays great accuracy in cutting and a variety of facet-cut or facet-related designs (*7000 Years*, nos. 603–6). The glass is colorless, dark green, or blue, the walls are usually quite thick, and the design and workmanship are of excellent quality. The vessels must have originated in a glasshouse that operated at a high level. (Found among these vessels was a silver mount with drop spout and tapering stopper, which affords a precise idea of the way bottles were closed: see *7000 Years*, no. 603; *Arts of Islam*, London, nos. 122, 125. See also Fukai, *Persian Glass*, pl. 71, and Saldern, *Glas... Sammlung Hans Cohn*, no. 153, for related bottles.) Nothing comparable to those vessels was found in the Nishapur excavations. Whether the objects come from many places or from only one or two centers we do not know. Only further controlled excavations can answer the many still-unanswered questions.

It is clear even now, however, that not only vessel shapes but also the actual cutting of facets underwent changes. Although generally the wheel-cut facets cover almost the entire surface of a vessel (No. 167), widely spaced facets were apparently also appreciated (Nos. 166, 169; Kröger, *Glas*, nos. 188–89), even though the particular qualities of faceted glass and the mirrorlike reflections were lost. Facets also tended to be cut more shallowly than they had been in the Sasanian period, part of a change in stylistic principles which was evident as well in other artistic mediums (Kröger, *Sasanidischer Stuckdekor*, pp. 221–48). That the widely spaced oval facets are not unlike those on some Roman finds from Dura-Europos (Clairmont, *Glass Vessels ... Dura-Europos*, nos. 241ff., pl. 25, nos. 307–8, pl. 29) is a hint that various sources contributed to the Islamic facet style.

166. Bowl

Colorless
H. unknown; Diam. 20.6 cm
9th century
1939; Tepe Madraseh, well in S4
Discarded



Broken, mended. Base and part of wall section up to rim of a shallow segmental bowl, decorated on exterior. Rosette with eight petals within a ring of twin grooves, flanked by four rows of round, shallow facets.

This bowl is of a shallow type that, in shape and sometimes in decoration, harks back to the Sasanian period. Shallow bowls with facets or other kinds of decoration were found in Ctesiphon (Kröger, *Parthisches... Glasfunde von Ktesiphon*, nos. 176, 942) and are known from other excavations (Lamm, "Verres ...à Suse," p. 365, pl. 80:4) or clandestine diggings (Lamm, *Glass from Iran*, pl. 30B; K. Erdmann, "Neuerworbene Gläser," pp. 32–35, fig. 2a–b; *Tribute to Persia*, Corning, no. 21; *Important Islamic... Art*, Christie's, no. 477). Ultimately, the shallow segmental bowl, shaped like the segment of a sphere, has antecedents in the late Achaemenid–early Hellenistic period (Saldern, "Achaemenid... Glass," fig. 1).

The deeply cut eight-petaled rosette in this bowl's center has a counterpart in a fragment from a similar bowl said to be from Nishapur (unpublished; Berlin, Museum für Islamische Kunst, I.53/71). It seems to be characteristic of two types of early Islamic bowls: the type represented here, and a more common shallow bowl with a flat base and a short vertical rim. The decoration usually consists of crudely engraved rosettes or angular patterns and a band of oval facets near the rim (Buckley, *Art of Glass*, no. 80-1, pl. 11-2; Harden et al., *Masterpieces*, no. 141).

---

167. Fragment of a beaker

Colorless, yellowish green tinge. Corrosion and iridescence
H. 9.2 cm; Diam. of base 5.2 cm; Th. of wall 0.1 cm
10th century
1939; Tepe Madraseh, H4
MMA 48.101.264



Broken, mended. Lower part of a flaring beaker. Thick flat base with rounded interior and flaring walls becoming thin toward rim. Decorated base: pontil mark in center nearly ground off and replaced by circular facet, three (originally four?) oval facets around it in cross form (the fourth probably destroyed by chipping). Wall divided into four zones: (upward from base) a band of sixteen oblong facets; a central panel of honeycomb design containing five rows of facets, hexagonal to circular, bordered above and below by grooves; an undecorated zone; an upper portion, details of which are difficult to discern.

This flaring beaker with its allover design of well-executed facets belongs to a group of vessels worked with great care. The rounded interior and thickness near the base suggest that before it was engraved the beaker was mold blown.

A number of beakers can be cited for comparable shape or facet decoration, although none is identical to this piece. The shape may go back to Sasanian and ultimately Roman flaring vessels (see Harper, *Royal Hunter*, no. 79). Both a beaker from the excavation in Tūrang Tepe (Boucharlat and Lecomte, *Fouilles*, pl. 103, no. 2) and a thick-walled example in Copenhagen (Folsach, *Islamic Art*, no. 38/1966) have four rows of oval or round facets. A second type has five rows of oval or round facets bordered by double bands, with the upper part of the flaring beaker undecorated (Kröger, *Glas*, no. 184, and Saldern, *Glassammlung Hentrich*, no. 403). A cylindrical beaker excavated at Dwin and dated to the ninth century has four rows of circular facets, leaving the top and bottom zones undecorated (Janpoladian and Kalantarian, *Trade Relations*, pl. 4:1–2). Thus decoration with facets was also popular for cylindrical beakers, as is further demonstrated by a beaker with circular facets of exceptionally fine workmanship in the Los Angeles County Museum (*Ancient Bronzes*, p. 126, no. 717).

These parallels make it clear that there was a continuation of the Sasanian faceting of bowls, but now applied to a different shape and with differently structured facets. What is surprising is that the faceted hemispherical-bottomed bowl seems not to have survived but rather to have been succeeded by similarly shaped bowls decorated with a different pattern (Nos. 182, 183).

---

168. Miniature jar

Colorless. Corrosion; extensive iridescence
H. 1.3 cm; Diam. 1.4 cm, of opening 0.5 cm;
Th. at rim 0.2–0.3 cm
9th–10th century
1939; provenance unknown
MMA 40.170.448



Complete. Flat circular base, slightly convex body, cut rim. Seven oval facets around the body.

The shape of this small jar is closely paralleled by those of other miniature jars, differently decorated or undecorated, found during the excavation; see Numbers 174–176, 54, 55.

---

169. Jug

Colorless, yellowish tinge
H. 11.6 cm; Diam. 7.8 cm
10th century
1939; Tepe Madraseh, W15, drain in gatch level
Tehran, Iran Bastan Museum 3955



Nearly complete, but part of rim section missing. Flat ring base, globular body, flaring neck. Applied handle reaching from body to rim, with additional globs of glass near the rim. Thumb-rest a plain flat disk. Decorated with two rows of shallow oval facets around body (except for area where handle joins), framed by simple horizontal lines. On the neck an additional facet and two deep diagonal grooves forming a partial V. Handle undecorated.

Reference: Wilkinson, "Water," p. 181.

Other vessels of this shape were found in the excavations: a larger example with stamped decoration (No. 141) and a jug with slant-cut design (No. 228). All three belong to a type with a flat base ring. A slightly taller jug with a round body and a wide-mouthed neck but without a base ring, said to be from Gurgān, shows an identical scheme of decoration, with two rows of facets framed by a simple line and half-round cuts below the rim. The handle zone is again free of ornamentation: see Fukai, *Persian Glass*, p. 63, fig. 72, pl. 69. A differently shaped jug is decorated with oval facets: *Glass... Smith Collection*, no. 560. Undecorated space around the handle, a very common feature found on numerous wheel-cut jugs and ewers, shows that the handle was put on before the vessel went to the engravers' department.

---

170. Bottle

Colorless, yellowish green tinge. Corrosion; iridescence
H. 5.3 cm; Diam.: base 3.8 cm, shoulder 4.4 cm, neck 1.2 cm; Th. of wall 0.15 cm
10th century
1939; Qanāt Tepe
MMA 48.101.270



Vessel body complete but cracked; neck missing. Kick-base with pontil mark. Flaring wall, rounded shoulder. Horizontal grooves around the body, twin lines between single lines. Around the shoulder a row of small oval facets and another groove.

This small bottle perhaps had a cylindrical neck and is a smaller version of the two bottles that follow, one of which also has a row of small oval facets around the shoulder. This vessel exemplifies the widespread use of a simple pattern of facets and grooves.

---

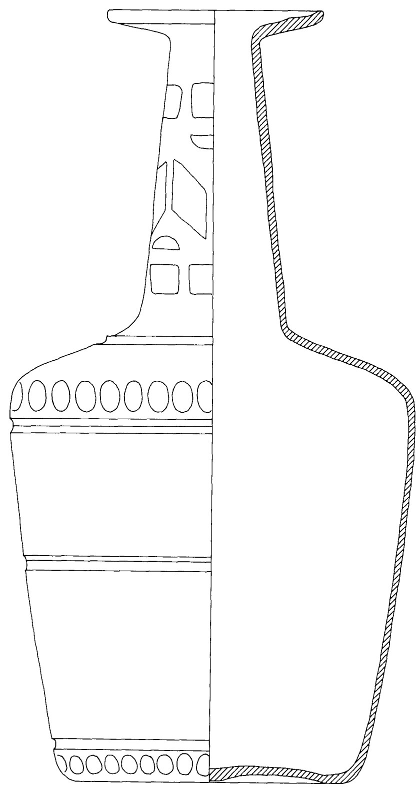
171. Bottle

Colorless, greenish tinge. Iridescence (now cleaned)
H. 22 cm; Diam. 12 cm
10th century
1947; Tepe Madraseh, X21, deep level, pit A
MMA 48.101.10

Broken, mended. A number of pieces missing from body and rim section, some now restored. A large bottle with flat base, flaring walls, tapering neck with flattened rim. On the base, four grooves forming a square around a crude pontil mark. A row of oval facets on the shoulder and at the juncture of base and wall. Three horizontal grooves around the body and one around the shoulder. On the neck rectangular and diagonal diamond-shaped facets in rows, with irregular half circles between them.

References: Jenkins, "Islamic Glass," no. 29 (dated first half of the eleventh century); An Jiayao, "On Early Islamic Glasses," p. 1120, fig. 3, top.

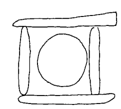
It is apparent from the number of similarly shaped bottles found in the excavations (see Nos. 108, 109) that this body shape is a standard one for bottles, widely used both with and without decoration. A faceted neck is another popular feature (see Lamm, *Glass from Iran*, pl. 33 D; Jenkins, "Islamic Glass," p. 7; Janpoladian, *Medieval Glassware*, pls. 80–82). Parallels may also be cited for the use of facets and grooves in a decorative pattern, with the neck's decoration either identical or showing a related pattern (see K. Erdmann, "Fatimidischen Bergkristallkannen," p. 195, fig. 58; *Tribute to Persia*, Corning, no.



18). These examples are evidently executed with greater care than the vessel shown here and relate more closely to the bottle that follows, Number 172.

Recently a bottle of very similar shape and decoration, but even larger (26.4 cm), has come to light in China. It comes from the stupa of the Dule Temple in Jixian, Tianjing, and thus can be dated to before A.D. 1058 (An Jiayao, "Dated Islamic Glass," p. 134, fig. 16). This find suggests that Nishapur bottles Numbers 171 and 172 may have to be dated to the tenth century. It also shows that cut glass objects with unsophisticated decoration were exported as far as China.

Since the undecorated bottle Number 108 and the decorated bottle Number 171 are from the same findspot, it is virtually certain that they were made in the same glasshouse.



On base



171

172. Bottle

Colorless. Greenish tinge. Iridescence
H. 23 cm; Diam. 13 cm
10th century
1939; Tepe Madraseh, S5, deep level
MMA 40.170.61

Broken, mended; numerous pieces missing, now restored. Large flask with a flat base, flaring body, rounded shoulder, slightly tapering neck, and flattened rim. On the base a circle cut around the pontil mark. Three deep horizontal grooves on the body and one on the shoulder. Three registers of oblong facets on the neck separated by two deep grooves. The rim carved around outer edge.

The shape of this bottle, with rounded shoulder and flaring rim, is a very specific type known only from two other examples, one in the David Collection (Folsach, *Islamic Art*, no. 221; *Art from the World of Islam*, Humlebaek, no. 18) and the other in the Victoria and Albert Museum ("Recent Important Acquisitions," 1966, p. 132, no. 20; Ayers, "Oriental Art," p. 359, inv. no. 20.1965). Both have elaborate relief-

cut decoration. While this bottle's simple design of cut lines cannot be compared with that sophisticated relief-cut ornamentation, many features of Number 172, such as the deep grooves around the body, the facet-cutting on the neck, the special treatment of the rim, and the carved circle around the pontil mark, display a high level of workmanship.

The same fine quality characterizes the two bottles mentioned in the previous entry. A decorative scheme with simple lines was executed at both lower and higher levels of workmanship and must simply have been a design that appealed to Iranian buyers. Thus there is no reason to assume that technical shortcomings dictated the use of this simple pattern. It is likely, however, that these vessels fetched a lower price than elaborately decorated ones.

The flaring rim on Number 172 seems to reach back to the Sasanian period, when a rim of the same kind was commonly found on a specific bottle type of very different shape (Harper, *Royal Hunter*, p. 153, no. 76, fig. 76a).

A vessel with a carved neck similar to that of Number 172 but with the rim uncarved is published in Lamm, *Glass from Iran*, pl. 33c.



172

173. Neck, fragment of a bottle

Colorless. Extensive iridescence
H. 7.8 cm; Diam. 2.6 cm; Th.: at wall 0.2 cm, at rim 0.35 cm
9th–10th century
1939(?); Sabz Pushan, 8F2
MMA 48.101.279

Cylindrical neck of a bottle, faceted with squares and parallelograms. Zone below the rim undecorated and cut in, with resulting rounded rim.



Many parallels to this fragmentary neck of superb workmanship can be adduced. There is no way of telling how the body of the bottle was decorated. Facet-cut necks were popular, and decoration of this kind on the neck did not necessarily correspond to that on the rest of the bottle. For example, this kind of faceted neck is found on a bottle carrying a linear-cut pattern ("Recent Important Acquisitions," 1965, p. 124, no. 16; H. Erdmann, *Iranische Kunst*, pl. 31), on a facet-cut bottle (Jenkins, *Glass*, no. 31), and on one with a slant-cut design (ibid., no. 30). It is even possible that the decoration of neck and body on these bottles was worked by different hands.

VESSELS CUT WITH DISKS

A disk with a small central boss that is conical or flattened was an extremely popular design motif during the early Islamic period. It exists in a number of versions, since both disks and bosses may have a variety of shapes.

The finds from the Nishapur excavation can be grouped by provenance. Of the miniature vessels Numbers 174–179, three are from Qanāt Tepe and one each from Village Tepe and Tepe Madraseh, whereas the larger vessels Numbers 180–185 are mainly from Tepe Madraseh. The exact provenance of the important small bowl Number 180 is unfortunately unknown. It is of dark blue glass; all the other examples are colorless.

The disk pattern was popular for miniature vessels, such as small jars and tiny bottles. On these the body is ground down on four sides, leaving a flat, disklike surface with a central protrusion (the boss) on each side (Nos. 174–177). Number 178, deviating somewhat from this scheme, has carved rings that create four disks, without a central boss. On the miniature jar Number 179 the disks are slightly oval, the boss round and flat. There are many vessels similar to these Nishapur examples; they seem to be mainly from Iran. The type may have originated in conjunction with the beginning of Islamic society, as no earlier examples are known.

The vessels Numbers 180–183 are bowls of different shapes with variations in the disk pattern. Unlike the flat disks of the miniature vessels, the disks of these vessels are cut in relief and have a more or less pronounced concave shape. The central boss can be conical (No. 180) or slightly rounded (Nos. 181–183). Whereas the disks on the bowl Number 180 are in high relief, those on the cylindrical beaker Number 181 are part of a pattern of octagons and smaller lozenges. The bowls Numbers 182 and 183 have a design of smaller disks placed on top of larger ones, with lozenges produced where the larger disks meet. Both bowls are rather crudely cut, and the design's effect suffers accordingly.

Numbers 184 and 185, from the well in S4 in Tepe Madraseh, are important because they show variations of the disk motif. On the small bowl Number 184, four ovals or almond shapes in relief alternating with four cone-shaped bosses surround a round central disk. The almond shapes may be compared with those on a cup of the ninth to tenth century (Jenkins, "Islamic Glass," no. 24) and a small bottle from Samarra (Lamm, *Glas von Samarra*, no. 215, pl. 7). A small bowl, now lost, may have had both disks and almond shapes (Lamm, *Mittelalterliche Gläser*, p. 145, pl. 52:7). On the jar Number 185 the ovals are larger, with additional ovals on top. This variant has a number of parallels and seems to have been popular from the ninth century onward (Lamm, *Glas von Samarra*, no. 223, fig. 41), particularly for jars.

The material this group presents is not homogeneous; it probably shows the most important types in use at the time in northern Iran. Since the miniature vessels occur undecorated (Nos. 54–57) and also with the decoration seen here, they seem to be typical for the early Islamic period in Iran. Vessels of this size are not known to have been made in the Sasanian period.

Among the larger vessels there are various shapes: small bowls resting on a round foot (Nos. 180, 184), jars, and cylindrical vessels.

Only this group among the finds contains examples of the Sasanian-type hemispherical-bottomed bowl, Numbers 182 and 183. As noted, both bowls show a variant of the pattern with double disks. Since the shape follows Sasanian prototypes, it seems very likely that the pattern comes out of a Sasanian tradition. Unlike facet designs, which are known in numerous finds from different regions and over a large time period, the few early examples of the disk pattern are not easy to date with any precision. The pattern has been discussed in connection with vessels of related design in the Treasury of San Marco in Venice and elsewhere; the Nishapur finds need to be seen in a larger context that includes the artistic production of the Byzantine world.

Two bowls from uncontrolled excavations are the best examples known so far from Iran (Leth, *Davids Samling*, p. 10; Saldern, "So-called Byzantine Glass," fig. 1). With their large roundels in high relief and pointed cones, they represent a slightly different, probably earlier version of the theme than do the Nishapur finds. On the basis

of their shape and the proportions of the pattern they should most likely be dated to the late Sasanian period. A bowl in San Marco can be compared with these examples (A. Grabar, "Opere bizantine," no. 65, pl. 56). Another very good example is a bowl in the Halberstadt cathedral (R. Schmidt, *Glas*, p. 38, fig. 19; Lamm, *Mittelalterliche Gläser*, p. 145, pl. 52:4; Saldern, "So-called Byzantine Glass," fig. 2, no. 4) with disks that closely parallel those on Number 180. However, it is still unclear whether its provenance and date are Byzantine (Lamm, loc. cit., dating it 650–750) or Sasanian/early Islamic (Saldern, op. cit., pp. 130–32). The peculiarities of the disks and their resemblance to the Nishapur finds make an early Islamic date very likely.

In the context of the question whether these outstanding vessels should be dated to the early Islamic period or assigned a Sasanian or Byzantine provenance, it is most important to discuss the two small bowls Numbers 180 and 184. They differ in size but are related in form and in the arrangement of their designs. Both have a low wall and rest on a small, rounded foot. Their decoration consists of disks or almond shapes which are separated by small cones, placed in the spandrels (No. 180) or between the almond shapes (No. 184). A related vessel of supposedly late Sasanian date, said to come from Gīlān Province (Fukai, *Persian Glass*, no. 27), also has cones in the spandrels. On this piece there is a cone on the central disk, which thus cannot have served as a foot, since the cone would have prevented the vessel from standing securely.

The Nishapur bowls and related vessels can be connected to a group of shallow bowls in the Treasury of San Marco. They have been assigned a variety of dates: early Byzantine (Lamm, *Mittelalterliche Gläser*, p. 146, pl. 52:9, dated to 650–750); Macedonian Renaissance (A. Grabar, "Opere bizantine," pp. 16–17, nos. 78–81, dated to eleventh century); and Sasanian/early Islamic (Saldern, "So-called Byzantine Glass," dated late sixth to eighth century). Disk designs were, along with facet patterns, among the most common wheel-cut glass decorations. The Nishapur finds, the examples mentioned earlier of late Sasanian date, and the many early Islamic vessels with the disk design seem to confirm Saldern's theory that the bowls in San Marco could be products of the early Islamic period. Since the extremely shallow bowl shape is not common for Sasanian glass vessels but is well known from the ninth century (Lamm, *Glas von Samarra*, no. 168, pl. 4; Kröger, *Parthisches... Glasfunde von Ktesiphon*, no. 942), perhaps a date in the ninth century is the most likely. In that case, these vessels could be regarded as additional links between the Sasanian and the Islamic periods and, more importantly, as illustrations of the high level reached by caliphal workshops. Further confirmation of the outstanding quality that glasswork attained in the ninth and tenth centuries is provided by a wide bowl with relief-cut decoration, including a row of twenty-eight pyramid-shaped spikes around the wall, which was excavated in China (An Jiayao, "Dated Islamic Glass," p. 130, fig. 14). This decoration is a variation, albeit rather distant, of the disk-and-boss theme. The tomb of Princess Chenguo, from which the bowl comes, is dated to A.D. 1018, providing a terminus ante quem for the object; but the date could be considerably earlier, since a valued work of art might see long use before finally being deposited in a grave.

The various versions of the disk pattern demonstrate that it had a widespread use and underwent numerous changes. Finds from Samarra show that there the pattern was realized differently in the ninth century (Lamm, *Glas von Samarra*, pp. 73ff., nos. 222, 228, 230, figs. 46, 48). The disks are usually not worked in very high relief, and sometimes a grid remains between them. The same peculiarity appears on a fragment from Fusṭāṭ (Lamm, *Mittelalterliche Gläser*, pl. 52:3), which Lamm classified as Byzantine. However, related examples from Samarra (*Excavations at Samarra*, pl. 122) and Nishapur (No. 181), both of the ninth century, show that the Fusṭāṭ fragment too should be dated to the early Islamic period. Other changes in design over time are noticeable, the most obvious being that the disks decrease in size and height of relief, becoming flat disks with small raised dots. This version is seen on shallow bowls (Lamm, *Mittelalterliche Gläser*, p. 145, pl. 52:7; Kröger, *Glas*, no. 167; Leth, *Davids Samling*, p. 111, inv. no. 9/1972); on cylindrical beakers (Saldern, "Sas-

sanidische... Gläser," pp. 41–42, fig. 6; "Recent Important Acquisitions," 1971, pp. 140–41, no. 30; *Tribute to Persia*, Corning, no. 14; Hasson, *Early Islamic Glass*, ill. 56); on spherical vessels (Kröger, *Glas*, no. 179; Jenkins, "Islamic Glass," no. 25); on bottles (Kröger, *Glas*, nos. 170, 180; Folsach, *Islamic Art*, no. 215); and on ewers (*Tribute to Persia*, Corning, no. 15). Other variants are the pattern of double disks similar to that on Numbers 182 and 183 (Lamm, *Mittelalterliche Gläser*, p. 154, pl. 57:10), the combination of disks on oval panels (Kröger, *Glas*, no. 181), and a design of ovals with central dots (Lamm, op. cit., p. 153, pl. 57:1). The integration of disks into continuous patterns, as on Number 181, or into possibly even more complex patterns, as is known from Iraq (Lamm, *Glas von Samarra*, no. 228, fig. 48) and Iran (Lamm, *Glass from Iran*, pl. 31E–J), seems to have been common. The combining of disks with different motifs, also known from objects excavated in Dwin (Janpoladian and Kalantarian, *Trade Relations*, pl. 5: 1–2), seems to be a typical feature of the early Islamic period. As excavation finds indicate, these various kinds of patterns existed side by side during the ninth and tenth centuries.

The examples that have been cited, all wheel-cut, are mainly from Iran, where the pattern seems to have developed and then branched out into numerous variants, as Pinder-Wilson has noted (Pinder-Wilson and Scanlon, "Glass... Fustat: 1972–1980," no. 9). The pattern, reduced to a circle with a central roundel or dot and thus suitable for a planar surface, was also rendered in other glass techniques. Examples in the Nishapur region are Numbers 126–128 (mold blown) and 138 and 139 (pinched).

The pattern of disks within a composition of octagons and lozenges that appears on Number 181 was also adapted for mold-blown glass, as is evidenced by a bottle from the Gurgān region datable to the eleventh or twelfth century (Fukai, *Persian Glass*, pl. 74).

In its simple disk-and-boss version, the pattern spread throughout the Islamic world. One example, a fragmentary mold-blown vessel from Fusṭāṭ, dates from about A.D. 900 (Pinder-Wilson and Scanlon, "Glass... Fustat: 1972–1980," no. 9; also compare Lamm, *Glas von Samarra*, no. 167, pl. 3). Numerous other pieces show that the design was frequently produced in the pinched and stamped techniques as well (Kröger, *Parthisches... Glasfunde von Ktesiphon*, nos. 923–25; idem, *Glas*, nos. 58–63, 105, 112). Rachel Hasson has demonstrated the pattern's popularity in metalwork (*Early Islamic Glass*, pp. 30–31), and Charles Wilkinson illustrated a ceramic bowl excavated at Nishapur (Fig. 8) which shows that by the end of the tenth century the simplified design was also used to decorate pottery vessels (Wilkinson, *Nishapur: Pottery*, pp. 214, 221, 228, no. 20).



Figure 8. Bowl with a glaze decoration of circles and dots. Ceramic. From Sabz Pushan, Nishapur. Tehran, Iran Bastan Museum

174. Miniature jar

Colorless
H. 1.3 cm; Diam. 1.5 cm
9th–10th century
1938; Qanāt Tepe
Tehran, Iran Bastan Museum 20436



Complete. Flat base, square body, flat rim. On each of the four sides, a disk with a central protrusion. Ovals cut in the spandrels.

For a number of related miniature jars see Lamm, *Glass from Iran*, pl. 31A–E. A larger jar with two rows of disks is shown in Kröger, *Glas*, no. 177.

175. Miniature jar

Colorless
H. 1.4 cm; Diam. 1.6 cm
9th–10th century
1938; Qanāt Tepe
Tehran, Iran Bastan Museum 20333

Complete. Cylindrical body with small round opening. Rim with marks of a modeling tool. On each of the four sides what seems to be a disk with a central protrusion.



176. Miniature jar

Colorless. Corrosion; iridescence
H. 1.3 cm; Diam.: 1.7 cm, neck 0.6 cm
9th–10th century
1939; provenance unknown
MMA 40.170.449



Complete. Flat, slightly irregular base, globular body. Around the body four disklike roundels with small central bosses. Oval cuts in the upper spandrels.

177. Miniature bottle

Colorless, yellowish tinge. Slightly dull surface; iridescence
H. 2.3 cm; Diam. 1.6 cm; Th. at rim 0.2 cm
9th–10th century
1939; Tepe Madraseh, well by maze in S4
MMA 40.170.64



Complete. Square cut, slightly flaring body; flat base. Body cut in four disks with protruding central bosses. Cylindrical neck with five facets, flat rim.

Compare Clairmont, *Benaki Museum*, no. 100, pl. 7.

178. Miniature jar

Colorless. Slight corrosion; iridescence
H. 2.1 cm; Diam.: 2.8 cm, of neck 1.2 cm; Th. at rim 0.1 cm
9th–10th century
1938; Qanāt Tepe
MMA 39.40.143



Complete. Globular body, kick-base with pontil mark, slightly raised rim. On the body four disks with raised centers. In the spandrels small oval cuts.

For a related jar see Kröger, *Glas*, no. 165. Slightly larger jars with bosses in the center of the disks are a close variation; compare ibid., no. 178. Both these examples are from Iran.

For close parallels see a jar in the Art Institute of Chicago (Pope, *Survey*, pl. 1439 B) and another in the Benaki Museum (Clairmont, *Benaki Museum*, no. 100, pl. 7, erroneously called Sasanian of the sixth to eighth century).

179. Miniature jar

Colorless
H. 2.4 cm; Diam. 2.3 cm
9th–10th century
1937; Village Tepe
Tehran, Iran Bastan Museum 21281

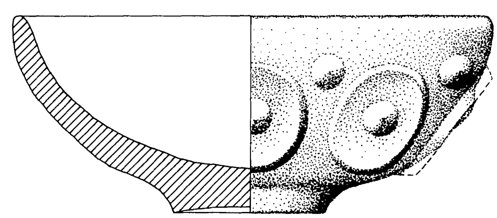


Complete. Flat base, square body, rim cut even. On the base an engraved X. On the four sides of the body, oval disks with central protrusions. Ovals cut in the spandrels. A deep groove near the rim probably an irregularity of the glass.

180. Part of a bowl

Dark blue. Weathering, slight iridescence
H. 3.6 cm; Diam. (reconstructed) 9 cm; Th. at rim 0.4–0.7 cm
9th century
1947; provenance unknown
MMA 48.101.19

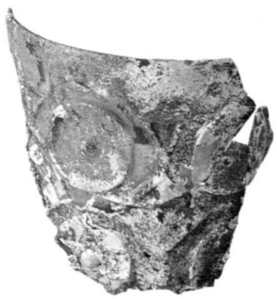
Less than half remaining of a small, thick-walled, heavy bowl. Round, flat base; rim with rounded profile. On the exterior a row of circular disks (diam. 2.1–2.2 cm) with cone-shaped central bosses. In the upper spandrels between the disks, additional cone-like projections.





181. Part of a beaker

Colorless
H. 6.5 cm; L. 7.6 cm
9th century
1939; Tepe Madraseh, well in W0, deep level
Discarded



Section of the upper wall of a beaker, probably cylindrical in shape. On the surface two rows of raised disks with central bosses, in a linear grid of lozenges. Area below the rim apparently ground flat and left undecorated.

A good parallel is offered by a fragmentary cylindrical beaker from Samarra; see *Excavations at Samarra*, pl. 122. For a bottle with a decoration of disks placed against hexagons, one of the many variants of this type of decoration, see Saldern, *Ancient Glass*, Boston, no. 63; the bottle, probably produced in Iraq, has been given a sixth-to-eighth-century date.

182. Fragments of a bowl

Colorless. Iridescence
H. 9.8 cm; Diam. approx. 10 cm; Th. of wall 0.7 cm
9th–10th century
1939; Tepe Madraseh, well in X2
MMA 48.101.262a-b



182

Fragmentary. Two joining fragments that constitute about one-third of a thick-walled bowl with a hemispherical bottom. Around the wall two rows of crudely cut raised disks with central projections, set on larger disks. Lozenges composed of four slanting sides between the large disks. The larger disks reach nearly to the rim. A band one centimeter deep on the interior wall at the rim ground down to produce a thin lip. Many scratches on the surface.

Grinding down to produce a thin lip is very common and may also be seen on numerous cylindrical beakers; see Pinder-Wilson, "Cut-Glass Vessels," p. 37, pl. 18, and Kröger, *Glas*, no. 181, for two examples.

183. Bowl

Colorless
H. 10.2 cm; Diam. 11.5 cm
9th–10th century
1939; Tepe Madraseh, Y2 below first gatch floor
Tehran, Iran Bastan Museum 20543

Broken, mended. Approximately half a bowl with a hemispherical bottom and somewhat elongated wall. Around the wall two rows of raised disks with central cones, set on larger disks. The base probably formed by a disk. Interior wall at the rim ground down to produce a thin lip, as on Number 182.

Reference: Kordmahini, *Glass*, Persian section, p. 29, fig. 6.



183

---

184. Part of a bowl

Colorless, yellowish tinge. Iridescence
H. 1.7 cm; Diam. 6.9 cm; Th. at rim 0.3 cm
9th–10th century
1939; Tepe Madraseh, well by maze in S4
MMA 48.101.261



Broken, mended. Two joining fragments making up half of a shallow bowl with thickened rim. Interior polished. On exterior a decoration of four concave almond shapes arranged in a cross around a disk in the center, which serves as a base. Small cones between the almond shapes.

---

185. Fragment of a vessel

Colorless. Incrustation, iridescence
H. 3.8 cm; Diam. (reconstructed) 6 cm; Th. at rim 0.3–0.6 cm
9th century
1939; Tepe Madraseh, well in S4
MMA 48.101.274



185

Section of the wall of a vessel, from rim to base. Vertical walls. Body divided into panels, probably seven, containing raised oblongs with rounded tops and slightly rounded bottoms, each having a raised oval with five or six horizontal cuts. Rim cut even and polished.

Compare Lamm, *Glass from Iran*, pl. 32E. For a finely cut bottle with oval panels see Charleston, "Glass," p. 302, fig. 13, and *7000 Years*, no. 605. A cylindrical beaker of the tenth century that has oval panels with disks in the center demonstrates that the two motifs were sometimes combined; see Kröger, *Glas*, no. 181.

MOLAR FLASKS

Although molar flasks—so called because of their peculiar toothlike shape—have been found in nearly all the Islamic countries, it is still not possible to discern distinct local characteristics of manufacture. This type of small flask, used as a container for valuable cosmetic liquids such as scented oils or perfume, quickly attained popularity in the ninth century and spread rapidly throughout the Islamic world. While Lamm believed that the flasks originated in Egypt and were thence exported to other lands, numerous finds suggest that they were made in all the Islamic glass centers where engraved glass was manufactured.

A molar flask was usually cast in a mold as a solid block; then it was drilled and polished to create an interior chamber, often tear-shaped. The exterior shape is achieved by engraving and

subsequent polishing. The four feet are typically quite long but may also be short, as is the case with Number 189. There is considerable variation in design and in the quality of the execution. Some molar flasks attain a very high technical level. Except for Numbers 188 and 189, the Nishapur examples are of a simpler type.

The excavation results are disappointing with regard to molar flasks. In a city like Nishapur one would have expected to find a wide range of these scent bottles. Of the four flasks presented here, only one has an exact provenance (No. 189). The two intact examples were purchased during the 1936 season. The two flasks with similar decoration, Numbers 186 and 187, are both dark yellowish (emerald) green, a rather uncommon glass color (see p. 22). It is probably just by chance that molar flasks were not found in greater numbers, since these finely produced glass vessels fulfilled a very special need of Islamic society, and the excavation finds indicate that Nishapur was a rich center where an affluent clientele would have been able to afford these comparatively expensive items.

186. Flask

Dark yellowish (emerald) green. Patches of corrosion
H. 5.5 cm; Diam. 2 cm; Th. at neck 0.25 cm
9th–10th century
Excavation year and provenance unknown
MMA 48.101.282



Neck and parts of feet broken off. Rectangular body on four pointed wedge-shaped feet. The body divided into upper and lower zones by a horizontal groove. Horizontal cuts on upper parts of feet, vertical cuts in centers of upper section, and heart shapes cut on all four corners.

Compare Lamm, *Glass from Iran*, pl. 36 H, I. For molar flasks see Lamm, *Mittelalterliche Gläser*, pp. 163–64, pls. 59–62; idem, *Glas von Samarra*, nos. 215–19, fig. 45, pl. 7; idem, *Glass from Iran*, pls. 36 H, I, 37 A–E, G, H; Clairmont, *Benaki Museum*, nos. 304–9, pl. 17.

187. Flask

Dark yellowish (emerald) green. Slight weathering
H. 6.4 cm; Diam. 1.9 cm
9th–10th century
1936/37(?); purchase
MMA 37.40.35



Sections of feet missing and small parts chipped off. Rectangular body with four pointed wedge-shaped feet. Deep cuts below a horizontal groove, above it a vertical groove in the center of each side and deep cuts on all four sides. On the flaring neck a horizontal groove and rectangular cuts.

Compare Lamm, *Glass from Iran*, pl. 36 I; Kröger, *Glas*, nos. 148, 149.

188. Flask

Colorless. Iridescence
H. 7 cm; Diam. 1.9 cm; Th. at rim 0.25 cm
9th–10th century
1937; purchase
MMA 37.40.34



Small part of rim missing. Rectangular body on pointed, wedge-shaped feet. On the sides lozenges with central groove, set off from the body by deep, sculptural cuts. Seven facets around the neck.

For a related example excavated at Susa see Kervran, "Niveaux islamiques," 1984, pp. 213, 218–19, fig. 8, no. 27 (dated ninth–tenth century).

189. Flask

Colorless
H. 4.5 cm; Diam. 3.2 cm
9th–10th century
1939; Qanāt Tepe, 2A3
Discarded



Neck missing. Short, wedge-shaped feet. Shieldlike design at the four corners with roundels in high relief, each deeply divided in two by a wide groove. Square neck set off from the shoulder.

Compare Lamm, "Verres ... à Suse," p. 366, pl. 79:1; idem, *Glass from Iran*, pl. 37 E, G, H; Kröger, *Glas*, nos. 152, 155.

VESSELS WITH INSCRIPTIONS OR ANIMAL DECORATION

Only four vessels belong to this important group. They are all from Tepe Madraseh but have different findspots. Except for Number 193, for which a level designation is missing, all were found at a low level. The find level and the evidence of stylistic parallels make a date in the ninth century or perhaps the first half of the tenth century plausible. This group, together with some of the other wheel-cut finds, gives us an idea of the range of the rather sophisticated tableware produced in Nishapur during what seems to have been a very important period in the city's history.

190. Fragments of a beaker

Colorless
H. 9 cm; Diam. ca. 6.7 cm
9th–10th century
1939; Tepe Madraseh, below the floor in T6
Discarded

Broken, mended. Sherds from base and part of wall. Flat base, remains of a flaring body. Part of the wall ground down to make a spreading base and three raised horizontal bands. In the two zones between these bands the much-eroded remains of a cut design.

This is the only example among the relief-cut finds at Nishapur that has two friezes. Since the beaker is known only from a photograph, it is impossible to be precise about the details of the design. Most compa-

rable beakers have only two raised bands delimiting a single frieze with birds or stylized plants (also compare No. 192). A fragmentary beaker excavated in Fusṭāṭ that has a composition with birds has been dated to A.D. 900 (Pinder-Wilson and Scanlon, "Fustat: 1972–1980," no. 17). Other relief-cut beakers from Iran, of varying sizes, show that raised bands were used over a considerable period of time beginning in the ninth century (Lamm, *Glass from Iran*, pls. 7H, 32D [without splayed feet]; Harden et al., *Masterpieces*, no. 145; Hasson, *Early Islamic Glass*, ill. 20; Jenkins, "Islamic Glass," no. 26). Raised bands achieved by grinding back the surface were used to accentuate relief-cut bowls and bottles as well as beakers (cf. Charleston, *Masterpieces*, nos. 27, 28).



190

191. Beaker

Colorless
H. 6 cm; Diam. 8.6 cm
9th century
1947; Tepe Madraseh, lower level in X20 or X21
Discarded

Broken, mended. Sherds joining to the lower part of a beaker. Vertical wall and thick oval concave base made by grinding down the area around it. On the base an inscription in Kufic script, cut in reverse so that it reads correctly when seen from the inside. A proposed reading is "ʿamal al-Ardam" (work of al-Ardam),[1] but difficulties in reading the proper name make it far from certain.

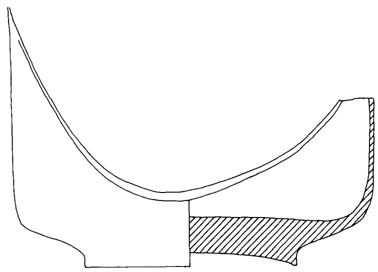
In shape this vessel is related to the cylindrical beakers, with or without decoration, much used in Nishapur (compare Nos. 37–53). Unlike them, however, it has a very thick base, which may have been achieved by first blowing the glass into a mold. Part of the base was subsequently ground down to create the concave oval. Only the rim of this oval served as a foot, so the incised inscription was protected from becoming scratched.

Because it is inscribed so as to be read from the inside, this beaker may well have been a drinking glass. It may be for a very simple reason that the inscription is cut on the outside and in reverse: if the beaker was of normal height, engraving an inscription inside the glass on the bottom would have been impossible. The method used here represented an ingenious solution. As far back as some Roman glass, inscriptions were written in reverse on the outside in order to be read through the vessel (Harden, *Glass of the Caesars*, nos. 107, 112). A beaker excavated in Dwin (Janpoladian, *Medieval Glassware*, pl. 13:3) has a Kufic inscription on the base, although evidently not in reverse; perhaps there was a widespread fashion for inscriptions engraved on the bases of glass vessels.

The Kufic inscription on this beaker can best be compared stylistically with inscriptions on pottery excavated during the Nishapur excavations (Wilkinson, *Nishapur: Pottery*, pp. 110–27, black-on-white ware) and on pottery said to come from Nishapur (Ghouchani, *Inscriptions*, pls. 1, 9, 23, 25, 30, 48, 58, 64, 75, 87, 105, 133). Compared with those, the inscription on Number 191 displays a somewhat more cramped, angular Kufic, a function of the limited space and the fact that it was made by rotation of a wheel. On pottery vessels, inscriptions placed inside and meant to be read during use are frequent, as are proper names.

It is likely that this beaker's peculiar foot should be seen in connection with hemispherical glass bowls of the Sasanian period decorated with bosses or roundels. These rest on similar high bosses, also slightly concave, that were cut from a thick block (Fukai, *Persian Glass*, pls. 12, 13, figs. 42, 43; Sugiyama, *Ancient Glass*, no. 53; Charleston, *Masterpieces*, no. 25). The Nishapur excavation finds clearly prove that this tradition was carried on (see Nos. 180, 184).

1. Translation kindly done by Ludvik Kalus.







191

192. Beaker

Colorless. Iridescence (now cleaned)
H. 11.5 cm; Diam. 7.8 cm; Th. at rim 0.1 cm
Second half of 9th century
1939; Tepe Madraseh, well in W0, deep level
MMA 40.170.180

Broken, mended. About half missing, now restored to complete vessel. Rounded base, flaring body. Base cut in an eight-petaled rosette with a circular ring and a protrusion in center. On the body, two thin horizontal ridges framing a wide register containing decoration. In its center, remains of an inscription in Kufic script with crouching birds above and below. An undecorated band on the vessel from upper ridge to rim. Inscription and outlines of petals and animals incised with light hatching. Inscription readable as "ʿamal..." (work of...) with only the last letter of the artist's name, an *h* or a *ta marbūṭa*, remaining.

Reference: Oliver, "Islamic Relief Cut Glass," pp. 18–19, fig. 19.

A number of features set this vessel apart from beakers of the usual type. Its lower part is distinguished from the rest of the body, and because of the carved rosette with central dot, the vessel would not have been able to stand. After use as a container for liquid it would have had to be turned upside down. It is not known whether such a practice existed, and there is no way to tell whether this vessel was actually used as a beaker. Its shape is connected to those of lamps (*Glass... Smith Collection*, no. 439; Smith, "New Finds," p. 115, pl. 6). A number of relief-cut vessels have come to light that show a similar shape except for a more pronounced knob and that carry a decoration of birds and/or inscriptions ("Recent Important Acquisitions," 1966, p. 132, no. 19; Hasson, *Early Islamic Glass*, ill. 23; unpublished vessel in the Museum für Kunst und Gewerbe, Hamburg, 1988.236. Also compare the inscribed bowl in *Art from the World of Islam*, Humlebaek, no. 17; Leth, *Davids Samling*, p. 17, no. 18/1964; Folsach, *Islamic Art*, no. 214). These vessels may have been lamps. This type of beaker is also found with a short stem and foot and with a decoration of large-bodied birds below a stylized Kufic inscription (K. Erdmann, "Neuerworbene Gläser," pp. 37–38 and fig. 10; Goldstein, "New Corning Museum," p. 53).

In 1961 Oliver was able to show that this beaker's relief carving places it firmly with a group of relief-





cut vessels of the late ninth to early tenth century, since the highly stylized flying birds have much in common with the ones on three vessels in Corning (Oliver, "Islamic Relief Cut Glass," pp. 18–19, fig. 19) and on a number of related vessels. The birds can be seen as abbreviated versions of the type of bird carved on the bird-and-ibex bowl in Corning (Fig. 9), which has a palmette tree that also links it stylistically to the Nishapur finds (see the mold-blown bottle No. 133) and which may in fact come from the Nishapur region. The birds on the Corning bowl, with their rather strange flying positions, resemble the procession of pigeons on a ceramic bowl excavated at Nishapur (Wilkinson, *Nishapur: Pottery*, pp. 191, 202, no. 44a) and thus firmly anchor the bowl in the artistic tradition of Nishapur. On the basis of the stylistic parallels and also the level of the findspot, Oliver dated this beaker to the second part of the ninth century. This still seems a valid proposal.

The inscription on this beaker is unusual in being conspicuously placed in the center of the vessel. But it simply gave the name of the craftsman, in decorative script. The last letter of the first word seems to have been joined to the first letter of the second word, suggesting that the inscription was made into a continuous ornamental band, a feature well known from Nishapur pottery (Ghouchani, *Inscriptions*, nos. 58, 74, 83, 87, 100). (Although the inscriptions on pottery differ from this example, a number of them seem related in a general way; see Ghouchani, pls. 37, 48, 64, 105.) The transformation of a banal message into the main subject matter of a decoration seems to be an original feature of early Islamic art in Iran (see O. Grabar, "Notes," p. 97).



Detail (vessel here restored)

192

193. Fragment of a vessel

Dark blue. Incrustation, slight iridescence
H. 7 cm; Th. at rim 0.3 cm; Th. of relief 0.2 cm
9th century
1939; Tepe Madraseh, X14
MMA 40.170.181

Section of wall up to rim. From a bowl, probably of globular shape, with relief-cut decoration. Below the polished rim a winged animal with head left, looking back to the right.





Figure 9. Two views of a bowl carved with birds and ibexes on the sides and with birds flanking a tree on the underside. Relief-cut glass. Iran, Nishapur(?), 9th–10th century. Corning, N.Y., The Corning Museum of Glass (53.1.109)

This fragment is unique in being cut of dark blue glass—an uncommon color for cut glass—and also decorated with fantastic animals. The decoration probably took the form of a frieze around the wall of the vessel. The fragment's shape seems to suggest that the bowl was globular with a slightly incurving rim (see Nos. 33–36). The existence of a number of carefully worked bowls, such as the Buckley bowl and the turquoise-colored bowl from the Treasury of San Marco in Venice, shows that glass bowls of high quality were widely used (Oliver, "Islamic Relief Cut Glass," pp. 13–14, figs. 7, 8; K. Erdmann, "Opere Islamiche," no. 117 and see also no. 118). Both the San Marco bowl and the bowl from which this fragment came may have been made in imitation of precious stone vessels, the San Marco bowl resembling turquoise and this bowl intended to give the impression of lapis lazuli. Jenkins and Keene cite medieval authors to demonstrate that glass was used as a substitute for more precious materials (*Islamic Jewelry*, pp. 27–28). This does not necessarily mean that the intention was to deceive buyers or that the glass could actually be mistaken for the material imitated. The topic has been dealt with previously by Lamm (*Mittelalterliche Gläser*, p. 515, no. 161) and by Charleston, who wrote that many of the glasses "might have been regarded as acceptable substitutes for the precious rock-crystal" (*Masterpieces*, no. 27, p. 71).

The fantastic winged animal, which is rendered with remarkable elegance, seems to advance to the left while looking backward. Its head shows a deeply cut round eye without any central point, and its mouth is indicated by a simple groove. Parallel notches are recognizable as the remains of an ear and a horn. The head is set off from the body by parallel grooves, and only certain parts of the upper body are countersunk, allowing a large drop-shaped lappet to appear in relief on the animal's breast. The outlines, including that of the wing, are notched all along. It is not clear what animal is depicted, but because of the wing it must be a fantastic creature (compare, e.g., Marschak, *Silberschätze*, fig. 146, a silver plate with a Kufic inscription and a depiction of a fantastic creature, said to be from Gurgān and dated to the first half of the eleventh century).

Winged animals, probably winged lions or horses, are shown turning backward on an Islamic textile of the eighth century (Gabrieli and Scerrato, *Gli Arabi*, fig. 518; Curatola, *Eredita dell'Islam*, no. 49); perhaps there was a repertoire of such images. Backward-turning animals are known in a variety of mediums: see K. Erdmann, "Fatimidischen Bergkristallkannen," pp. 194, 196, fig. 55, a glass bottle of the ninth century; K. Erdmann, "Opere Islamiche," pl. 90, lower right, a glass bottle without a neck; the Corning cameo ewer in Whitehouse, "Corning Ewer," figs. 1–5; and a stag on a silver bottle of the early twelfth century, Atıl, *Islamic Metalwork*, no. 10; Baer, *Metalwork*, pp. 286–87, fig. 230. These animals are not winged, however, and merely demonstrate that



193

the posture was a common one among depictions of animals in early Islamic art. None of these examples resembles the creature on this fragment.

Stylistically, the rendering of this animal differs considerably from the beaker Number 192 and the group of relief-cut vessels to which it belongs. On this fragment, it is only in certain areas that the design is executed by countersinking, or grinding down, and the contrast in depth between the countersunk parts and those remaining in relief is less distinct. Similarly, whereas in the relief-cut group an animal's eye is shown as a circular depression with a raised dot in the center, here it is simply a circular depression. Another drilled depression occurs at the point where the wing is attached to the body. The same circular depression can be seen where an animal's leg joins the body on a fragment from Samarra (Fig. 10) and on a number of other vessels, including a beaker and the well-known Corning ewer, which is otherwise stylistically different (Goldstein et al., *Cameo Glass*, no. 19 and fig. 13; Whitehouse, "Corning Ewer," figs. 1–5).

A lightly drilled dot can be seen on the animal's body below the lappet. Dotting of the body is a feature well known in Islamic relief-cut glass. It seems to have begun with a sparing use of dots in the ninth century (Fig. 10) and to have remained fashionable in Egypt until the eleventh century (Oliver, "Islamic Relief Cut Glass," pp. 17ff.). Oliver has shown that on later examples the whole body is sometimes covered with dots (ibid., p. 25, fig. 28; "Recent Important Acquisitions," 1966, p. 132, no. 19; K. Erdmann, "Opere Islamiche," nos. 120, 124, 125). Striated neck lines and notched borders or outlines occur on many relief-cut glasses, including the fragment from Samarra (Fig. 10) and the Buckley ewer (Oliver, op. cit., p. 14, fig. 9; K. Erdmann, op. cit., pl. 100). This creature's wing is stylized in a shape typical for both animals and plants, such as the split palmettes on the mold-blown bottles from Nishapur Numbers 133 and 134 or designs on luster dishes from Iraq (see also the luster dish with elaborated palmettes in Ettinghausen and Grabar, *Art and Architecture*, fig. 93).

Although the exact nature of this creature and its iconographic significance remain unknown, it is possible to say that stylistically the fragment belongs to an early phase of Iranian relief-cut glass. The fragment from Samarra and this piece have a number of corresponding features. On both fragments the head is not countersunk, the neck is striated, the body is partly or completely countersunk, there are drilled dots on the body, and the forms are defined by notched outlines. On the Samarra fragment a number of features—mouth, nose, eyes, ears—are carefully differentiated, whereas on the Nishapur fragment these details are treated more summarily. These various styles cannot yet be placed in chronological sequence; but it is probable that this fragment excavated in Nishapur, like the Samarra fragment, dates from the ninth century.

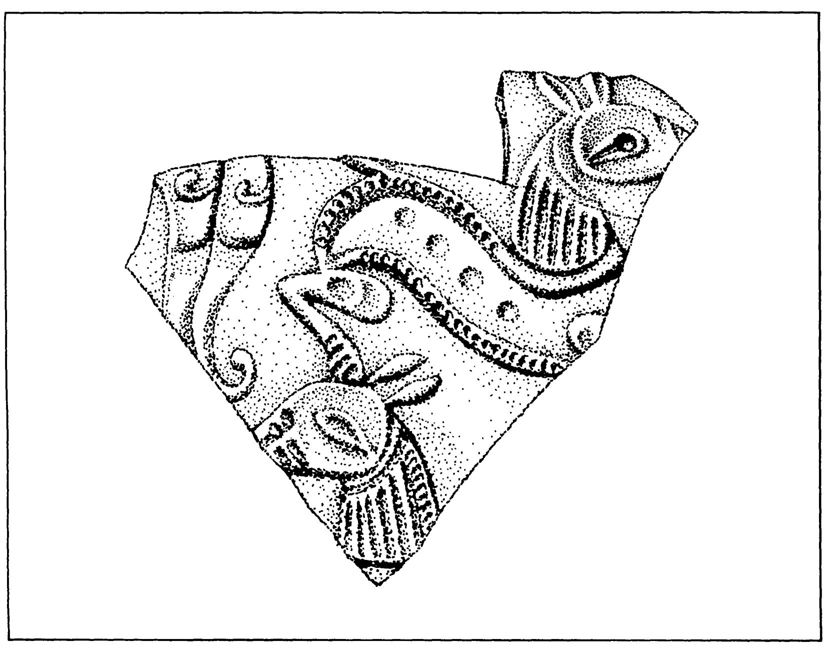


Figure 10. Fragment from a vessel carved with animals. Relief-cut glass. Samarra, Iraq, 9th century. Berlin, Museum für Islamische Kunst (Lamm, *Glas von Samarra*, no. 245)

VESSELS WITH PLANT DECORATION

Among the finds of relief-cut glass, only six small fragments seem to be from vessels on which plants were the main decorative motif. Three of the fragments (Nos. 194–196) are of the same type and also have the same findspot, a well in Tepe Madraseh. The other three fragments (No. 197), which form a second group, are without exact provenance. They probably belonged to one vessel. All six fragments are of colorless glass, as would be expected with glass of such high quality.

The fragments are all rather small and provide few clues about the types of vessels to which they belonged. Number 196 may be from the upper part of a larger cylindrical beaker like the one in the British Museum (Pinder-Wilson, "Cut-Glass Vessels," pp. 37–38, pls. 17, 18). The others must have belonged to vessels of globular shape, bowls or possibly bottles, since one of the fragments (No. 197) may be part of the neck of a bottle.

The fragments Numbers 194–196, all of which carry palmettes, are stylistically homogeneous. The sections of the leaves are set off in relief against each other, and the lower lobes show distinct curls. On Number 194, an important fragment unfortunately known only by its photograph, the stems are marked by dotlike notches. The rather complicated design carries a characteristic type of split palmette. The same kind of palmette may also be depicted on Number 195. Number 196 shows, below a straight ridge, a different kind of palmette that consists of a central budlike(?) feature on a stem from which large half-palmettes issue. The curling lower lobes of the half-palmettes place this fragment firmly within the group.

Numerous parallels to these distinct palmettes may be seen on glass vessels from Iraq and Iran. Among excavated finds, a number of fragments from Samarra show all the characteristics of this group, including a similar thickness of glass. Close parallels are provided by three fragments: see Lamm, *Glas von Samarra*, no. 246, pl. 6 (the closest), no. 242, pl. 6, and no. 249, pl. 8 (cameo glass). Fragments of shallow segmental bowls said to be from Nishapur carry related palmettes (K. Erdmann, "Opere Islamiche," p. 114, pl. 100, upper right; also, numerous unpublished fragments). Complete vessels, such as a bowl with related palmettes, are also known (*Art from the World of Islam*, Humlebaek, no. 16). Most of these examples are said to come from Iran, and it seems reasonable to assume that the style was widespread during the ninth century. This is further suggested by the existence of numerous variations on this relief-cut style, employing some type of palmette, leaves, or vine, that have no immediate parallels among the Nishapur finds (*Tribute to Persia*, Corning, no. 21; Charleston, "Glass," p. 302, pl. 12). A fragmentary bowl with a tree of split palmettes, excavated in Dwin but imported, probably from Iraq or Iran, and dating from the ninth century, shows how widespread this type of decoration was (Janpoladian, *Medieval Glassware*, pl. 9; Janpoladian and Kalantarian, *Trade Relations*, pl. 22: 1, 2). The close parallels from Samarra allow the fragments Numbers 194–196 to be dated to a period probably reaching from the end of the ninth century into the first half of the tenth century.

The three fragments Number 197, probably from one vessel, show an entirely different treatment. The design is carved in high relief, with the background to the ornament ground away and the wall of the vessel reduced to extreme thinness. The high relief and the absence of a second plane impart a somewhat stiff quality to the design. The raised parts of the relief are treated with notches or cross-hatching: the stems have cross-hatching and very regular notching produced by parallel cuts, and the palmette on the large fragment is also crosshatched. The palmette on these fragments is unlike the type on Numbers 194–196, and in this case a trefoil also appears.

In details of style, Number 197 resembles a number of known relief-cut vessels. There are related palmettes on a bottle in the Victoria and Albert Museum ("Recent Important Acquisitions," 1966, p. 132, no. 20; Ayers, "Oriental Art," p. 359, inv. no. 20.1965). Cross-hatching occurs on a leaf on a fragment in Berlin which otherwise belongs to the group of Numbers

194–196 (K. Erdmann, "Opere Islamiche," pl. 100, top right). The relationship between the countersunk areas and the height of the relief is similar to that on the Buckley ewer, which also has a related surface treatment (ibid., pl. 100). Because it shares with these fragments a certain stiffness, the Corning cameo ewer should be mentioned as well (Goldstein et al., *Cameo Glass*, p. 30, fig. 13). These parallels support the assignment of a tenth-century date to these fragments.

194. Fragment of a vessel

Colorless
L. 6.8 cm
9th–first half of 10th century
1939; Tepe Madraseh, well in S4
Discarded

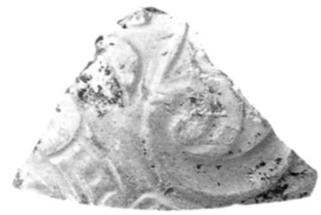
Section of wall from a globular vessel. Decoration consisting of split palmettes on stems that have diagonal notches.



195. Fragment of a vessel

Colorless. Extensive iridescence
L. 4.9 cm; Th. of wall 0.2–0.4 cm
9th–first half of 10th century
1939; Tepe Madraseh, well in S4
MMA 48.101.273a

Section of convex wall from a globular vessel. Decoration of palmette scrolls.



195

196. Fragment of a vessel

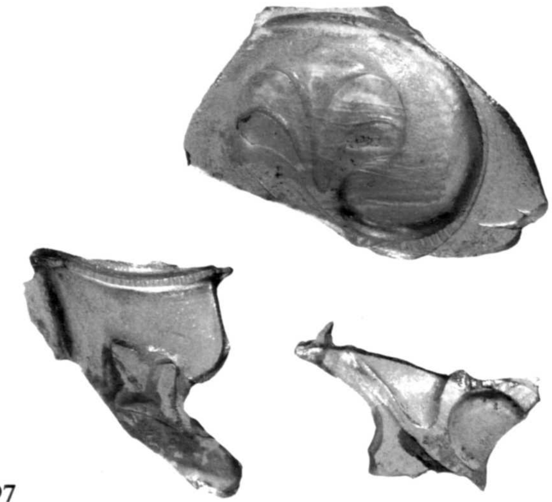
Colorless. Corrosion; extensive iridescence
L. 5.2 cm; Th. of wall 0.1–0.4 cm
9th–first half of 10th century
1939; Tepe Madraseh, well in S4
MMA 48.101.273b

Section of wall from an unknown type of vessel. Decoration part of a scroll.



197. Three fragments

Colorless. Iridescence
L. 3.5 cm; Th. of wall 0.1 cm, of wall with relief 0.5 cm
10th century
Excavation year and provenance unknown
MMA 48.101.277a–c



197

Three small sherds from a vessel wall, all probably belonging to a single vessel of unknown shape. Carving in high relief. On the largest fragment a palmette on a curling stem, on the others a trefoil and parts of plant scrolls. Cross-hatching on parts of the palmette, parallel grooves on the stems of all fragments. Fragment with trefoil probably from the neck of a vessel.

VESSELS IN THE LINEAR STYLE

Four of the excavated vessels are decorated in what can be called a linear style. Technically it is made up of cut lines of various depths, U-shaped in cross section. It is typical for much of the surface to remain untouched by the pattern and thus act as a plain ground against which the pattern stands. A variety of themes, mostly based on vegetal forms, are treated in a geometrical, nearly abstract language. Simple elements such as horizontal and vertical cuts are used to define blossoms or denote the veins of leaves. Simple elements are repeated to compose rosettes (No. 198) or a continuous frieze (No. 199). The two bottles in this style show horizontal, vertical, or diagonal cuts making geometric patterns of the most elementary type. In the case of Number 201 they do not add up to a repeated pattern. The workmanship can be quite crude in some cases, with cut lines remaining unpolished (Nos. 198, 199, 201).

The vessels in this style are of varying types: a small shallow bowl, a cylindrical beaker, and two small unlike bottles. The finds of known provenance are from Tepe Madraseh (No. 198) and Qanāt Tepe (Nos. 199, 201). The glass is colorless or light green.

As excavations elsewhere have demonstrated, the linear style is not limited to Nishapur. It was an international style practiced in many Islamic countries. The earliest examples are a shallow bowl and a bottle from Fusṭāṭ datable to the eighth or ninth century (Pinder-Wilson and Scanlon, "Glass... Fustat: 1964–1971," no. 17 and idem, "Glass... Fustat: 1972–1980," no. 12). Finds from Samarra (Fig. 11), Susa, and Dwin are all datable to the ninth or possibly the tenth century (for Samarra: Lamm, *Glas von Samarra*, no. 185, pl. 5, and compare *Excavations at Samarra*, pl. 123 [the large bowl, lower left]; for Susa: Kervran, "Niveaux islamiques," 1984, pp. 218–19, pl. 1, fig. 8, nos. 22, 24; for Dwin: Janpoladian and Kalantarian, *Trade Relations*, pls. 6–8, 10, 14). The motifs vary according to the glass center in which the vessel originated; the common denominator of this style is the general approach and the abstract nature of the decoration. A characteristic feature is the use of circles or clusters of circles to represent blossoms, grapes, or other subjects. It may be mere coincidence that the circles do not appear on the four vessels from Nishapur. A bowl in the Cohn Collection, which has circles as well as a decoration very similar to that on Number 198, is probably from Iran, perhaps even from the Nishapur region (Saldern, *Glas ... Sammlung Hans Cohn*, no. 150). Plants are usually denoted by a few parallel cuts, horizontal or diagonal. Nonrepresentational designs were very popular.

It is still too early to discern the changes undergone by this linear style, because only a small number of vessels decorated in the style are available for study. Different motifs were certainly employed in different regions—designs from Iran are unlike those from Dwin, for example. We do not yet know where the style first developed or whether it was inspired by late Roman

cut designs (see *Glass... Smith Collection*, no. 372; Saldern, *Gläser... Sammlung Erwin Oppenländer*, no. 516).

Finds from different locations show considerable differences in workmanship. Whereas the bowl from Fusṭāṭ is skillfully made, for instance, Number 198 and another shallow bowl discussed with it, a cameo beaker from Samarra (Lamm, *Glas von Samarra*, no. 187, pl. 5), and two other cameo beakers said to be from Iran (Saldern, "Sassanidische... Gläser," p. 52, fig. 11; *3000 [Dreitausend] Jahre*, no. 623) are all rather crudely worked. Still, and despite the sometimes unpolished cut lines (compare Pinder-Wilson and Scanlon, "Glass... Fustat: 1972–1980," no. 12), it is not correct to call the style crude in general (see Saldern, *Glas... Sammlung Hans Cohn*, no. 150). Some works in the linear style achieve a high standard, such as the jug of superb workmanship in the Cohn Collection (ibid., no. 147).

Many of the objects in linear style are from clandestine diggings; those published are described as being from Iran (Lamm, *Glass from Iran*, pl. 32B; Leth, "Tidlig islamisk Kunst," no. 14; Folsach, *Islamic Art*, no. 222; Saldern, *Glassammlung Hentrich*, no. 404; idem, *Glas... Sammlung Hans Cohn*, no. 147; Billeter, *Glas*, p. 47 [inv. no. 1965-13]). However, the excavated vessels were unearthed in various regions of the Islamic world. As is demonstrated below, the fragment of a beaker excavated in Nishapur, Number 199, and the beaker in Zurich carry the

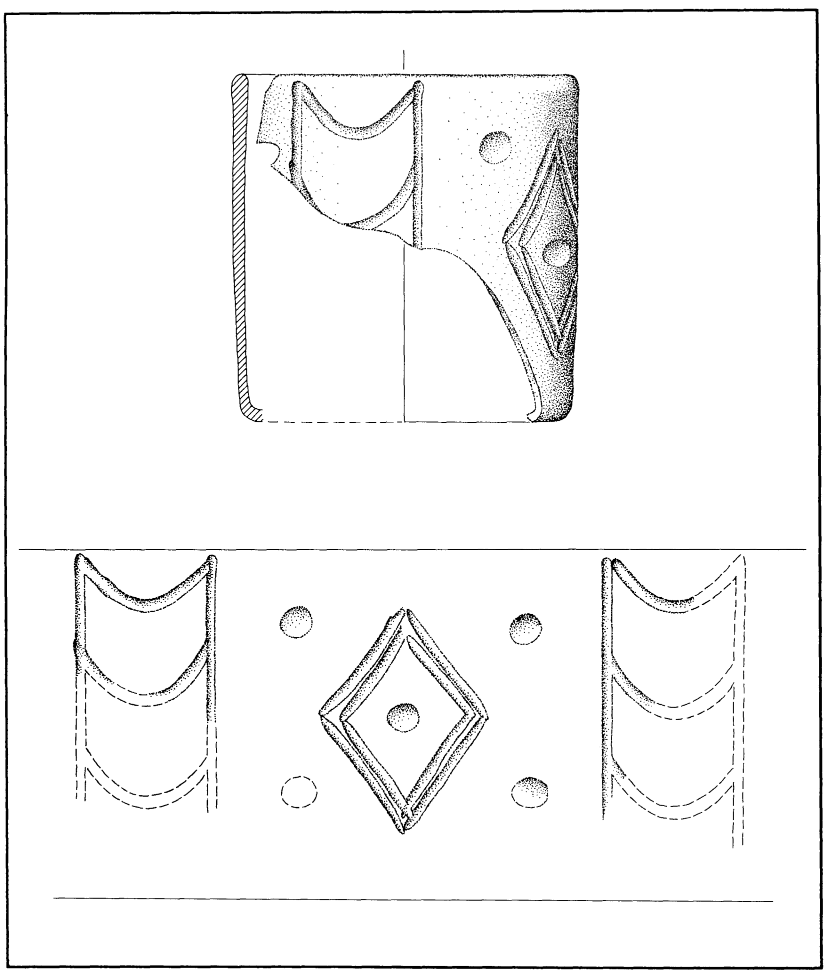


Figure 11. Beaker with linear-style decoration. Glass. Samarra, Iraq, probably 9th century. Berlin, Museum für Islamische Kunst (Lamm, *Glas von Samarra*, no. 185)

identical design. It may well be that the Zurich beaker came from a clandestine digging in the Nishapur region.

It is of particular interest that cylindrical beakers are typical for this style of decoration, while flaring beakers seem to be rare (see Auth, *Ancient Glass*, no. 229), because this is an indication that the style did not extend beyond the tenth century. Other vessel types worked in linear style include shallow segmental bowls and bowls with widened rims.

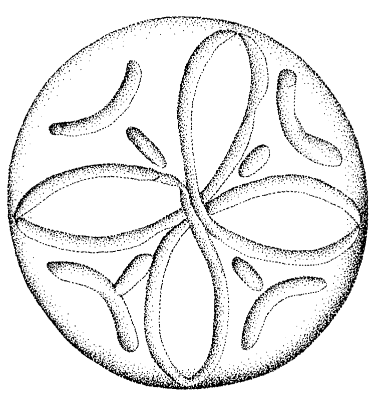
Both the preference for a cylindrical beaker shape and the characteristic designs of the linear style call to mind some vessels decorated in the pinched technique, specifically beakers excavated in Dwin and an Iranian beaker in Hamburg (Saldern, "Sassanidische . . . Gläser," fig. 17). Perhaps future excavations will shed some light on whether and in what way these very different techniques influenced one another.

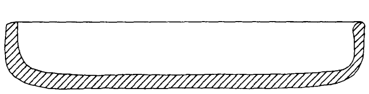


198

198. Bowl

Colorless. Iridescence
H. 1.5 cm; Diam. 8.3 cm
9th–10th century
1939; Tepe Madraseh, drain in To, deep level
MMA 40.170.59. Missing since 1974





Cracked; minor pieces missing. Small, shallow, segmental bowl. Flat base, rounded transition to short vertical wall. On the exterior of the base, four leaflike motifs arranged in a cross. Between them crescent shapes above short vertical lines, probably stylized flowers.

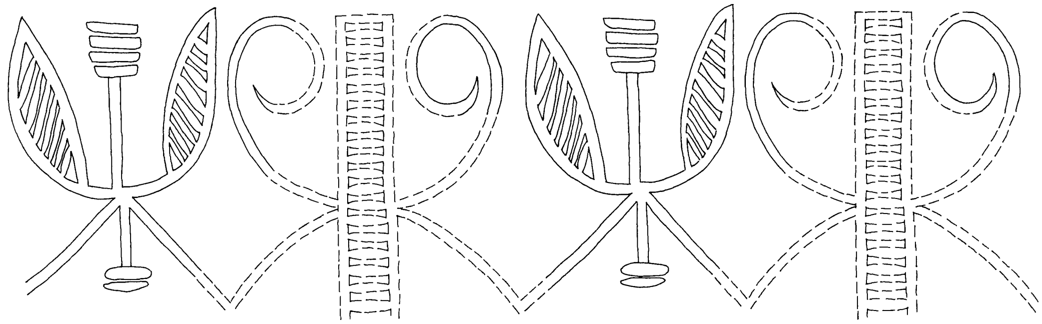
Unlike the shallow bowl Number 184, which has a well-defined foot, this vessel might conceivably have served as a lid. Its decoration can be interpreted as a rosette in which highly stylized flowers alternate with leaves. A larger shallow bowl of unknown provenance has a similar but more elaborate decoration, described as being crudely executed (Saldern, *Glas . . . Sammlung Hans Cohn*, no. 150). However, many close parallels show that despite the poor quality of the Cohn bowl, its design is a typical one for the linear style. The same can be said of Number 198.

---

199. Fragments of a beaker

Colorless
H. 6.9 cm; W. 7.6 cm
9th–10th century
1939; Qanāt Tepe
Discarded

Three joining sherds making up section of wall and rim, from a cylindrical beaker. Around the exterior wall an engraved frieze of stylized plants: a flower on a central stem, flanked by lozenge-shaped leaves with parallel lines, alternates with a second plant motif.





199

200. Bottle

Light green. Patches of iridescence
H. 4 cm; Diam. 1.6 cm; Th. at rim 0.2 cm
9th–10th century
1939(?); exact provenance unknown
MMA 48.101.289



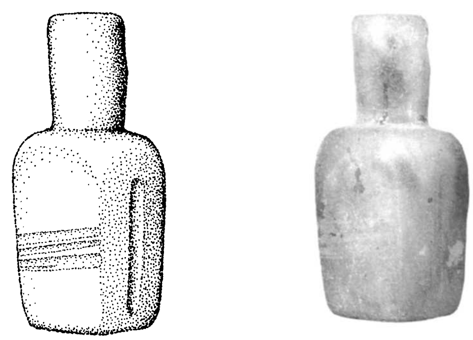
Although the engraving on this beaker was very shallow and the fragments themselves have been discarded, the design was well enough recorded to allow it to be classed with the highly stylized palmettes found on a number of vessels. A beaker in Zurich with a nearly identical frieze, described as coming from Nishapur, has been dated to the ninth to tenth century (Billeter, *Glas*, p. 47 [inv. no. 1965-13]). The Zurich beaker's frieze shows that the curled lines on Number 199 probably belonged to a second type of palmette. A jug with a more geometrical decoration of the same style (Ohm, *3000 Jahre . . . Frankfurt*, no. 117; Saldern, *Glas . . . Sammlung Hans Cohn*, no. 147) and other examples once on the art market provide ample evidence that this beaker cannot be seen as an isolated piece, but rather belonged with a whole group of vessels carrying a highly stylized decoration. Compare also the two differently decorated beakers in Kordmahini, *Glass*, pp. 29, 101 and p. 104.

Upper part of neck missing. Small cylindrical bottle, originally probably with flaring neck. On the flat base a pontil mark. Between horizontal lines above the base and around the neck, frieze of triangles within triangles, alternating upward and downward, circling the bottle.

Compare Lamm, *Glass from Iran*, pl. 34 E–G.

201. Bottle

Colorless
H. 5.2 cm; Diam. 1.6 cm
9th–10th century
1939; Qanāt Tepe
Tehran, Iran Bastan Museum 21256(?)



Complete. Small square bottle with flat base and cylindrical neck. Sides decorated with shallow cuts, three horizontal lines alternating with one vertical line.

Only the very shallow, hardly noticeable engraved lines differentiate this bottle of common type from numerous undecorated examples (compare Kröger, *Glas*, nos. 26, 27).

Simple diagonal and vertical lines are also seen on molar flasks; those may have served as a model for the decoration here, or the decoration of various types of small bottles may have been interrelated (Lamm, *Glass from Iran*, pls. 36H, 37C; also see above, Nos. 186, 187). This bottle is a good example of a vessel with minimal decoration. Although ornament is often used sparsely in this style, the designs can be very effective nevertheless (see also No. 200).

VESSELS IN THE INTERMEDIATE STYLE

A number of fragments, mostly from flaring beakers, carry decoration executed in what can properly be called an intermediate style. In the intermediate style, cut lines of the same type as those of the linear style are employed. Technically, then, there is little difference between the styles. However, in the intermediate style the cut-in lines are sometimes widened or cut on a slant, occupying more of the glass surface than a simple line does. This feature can best be seen in the short curved cuts on Numbers 202, 206, and 211. As will be discussed shortly, these slanting lines are a principal decorative feature of the slant-cut style. The intermediate style is so called because it occupies a place between the linear and the slant-cut styles.

The intermediate style differs from the linear style not only in the cutting of some lines but also in the approach to design. This is evident when the plant pattern of Number 199, in linear style, is compared with that of Number 206, in intermediate style. The linear-style patterns are more abstractly conceived than those of the intermediate style. Other design features that set the intermediate style apart from the linear style are short semicircular slanting cuts (Nos. 202, 204, 206, 207) and cross-hatching (Nos. 202, 203, 206, 212, 213).

Finds in the intermediate style are grouped here according to type of motif (except for the beaker Number 202, an example that stands somewhat apart from the other fragments). Geometrical patterns (Nos. 203–205), plant designs (Nos. 206–208), and friezes of empty arches (Nos. 209–211) are common. Cross-hatching dominates the decoration on a number of fragments (Nos. 212–216). Finally, two finds that belong to a coarse variant of the style are discussed together.

Of the seventeen vessels or vessel fragments, seven are from Tepe Madraseh, four from Sabz Pushan, one from the Village Tepe, and five without a recorded provenance. The medium is colorless glass; only one fragment has a greenish tint.

On cylindrical beakers decorated in either the linear or the intermediate style, the pattern usually extends to the rim (Nos. 199, 202). With flaring beakers decorated in the intermediate or slant-cut style, however, the upper part of the wall always remains undecorated.

In the linear as in the relief-cut style, the design appears against a plain background. In the intermediate style, a number of additional, isolated elements, often small cuts, are strewn across the background (Nos. 202–204). Decoration becomes still more dominant in the slant-cut style, so that on many examples the background is almost completely obliterated. The majority of vessels with decoration of this type are described as being from Iran.

202. Beaker

Colorless. Extensive iridescence
H. 10.3–10.4 cm; Diam.: at base 10 cm, at rim 10.6 cm; Th. at rim 0.3–0.4 cm
850–950
1938; Tepe Madraseh, drain in H4, lower level
MMA 39.40.42

Broken, mended; a number of pieces missing, now restored. Flat base with irregularities on one side. Pontil mark in the center ground down to a facet, a triangle engraved around it. Nearly vertical wall. A continuous decoration composed of two types of stylized birds in alternation. The beaker is unusually large, about 2 centimeters taller than is usual for beakers of this type.





202

Reference: Hauser and Wilkinson, "Museum's Excavations," p. 106 and figure on p. 82.

Both the shape and the decoration of this beaker are unique among the vessels in the intermediate style. Although undecorated beakers of this shape were common in Nishapur (Nos. 44–52), this piece and the fragment from Qanāt Tepe (No. 199) are the only examples of decorated cylindrical beakers found in the excavations. And while the fragment from Qanāt Tepe is decorated in a typical linear style, the decoration on this beaker shows the typical features of the intermediate style. A frieze of birds is rendered in linear and slanting cuts with a pattern of very precise cross-hatching on the birds' wings. The background is filled with isolated elements that include half circles and short strokes.

Slant cuts and cross-hatching appear on fragments excavated at Samarra; perhaps the style seen here was popular in that center. One fragment from Samarra in particular, with both slant cuts and cross-hatching (Fig. 12), seems a close parallel (Lamm, *Glas von Samarra*, no. 180, pl. 7, and see also nos. 187, 188, pl. 5; and see *Excavations at Samarra*, pl. 121).

Another important piece similar to Number 202, which probably dates, like the Samarra fragment, to the ninth century, is a beaker excavated in Birka, Sweden (Fig. 13); see further, Lamm, *Mittelalterliche Gläser*, p. 156, pl. 58:11; idem, *Oriental Glass*, pp. 11ff., pl. 3; *Islam: Konst och Kultur*, no. 27. Its place of origin is unknown. Its decoration consists of a stylized pinecone(?) flanked by double volutes and birds of the same type as those on the Nishapur beaker, although simplified and even more crudely stylized. This relationship was seen early on by Kurt Erdmann ("Fatimidischen Bergkristallkannen," p. 205, n. 49). Traces of paint show that at some time the beaker was painted. If they are as old as the beaker, they are a further indication that early Islamic glass was more often painted than has been thought. (Red paint was used as a ground for gold in Samarra, and a bottle found there is nearly completely painted; see Lamm, *Glas von Samarra*, no. 188, pl. 5, and no. 276, pl. 9. As its counterparts found in China show, the incised plate Number 164 may also have been gilded; see p. 117.) Perhaps the Birka beaker's crudeness of design is connected to the use of paint.

The beaker was found in Sweden with Ṭāḥarid and Samanid coins of the ninth century, making an origin in Iraq or Iran likely, since such coins were traded to Scandinavia in large numbers, possibly together with objects, from about 850 to about 925 (Raby, "Looking for Silver," pp. 193–94). Stylistically the Birka beaker differs from Nishapur glasswork, but the general similarity of the stylized birds hints at a wider Iranian tradition embracing both Nishapur and the beaker's place of origin. Therefore the Nishapur bird beaker can probably be dated to the second half of the ninth or the first half of the tenth century.

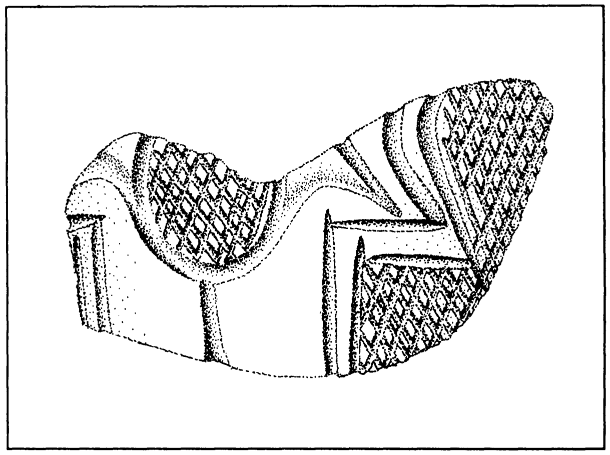


Figure 12. Fragment of a vessel in the intermediate style. Glass. Samarra, Iraq, 9th century. Berlin, Museum für Islamische Kunst (Lamm, *Glas von Samarra*, no. 180)

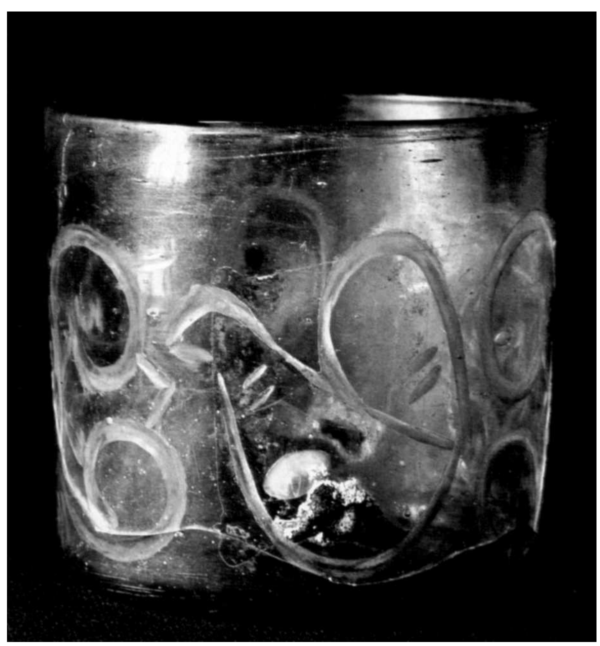
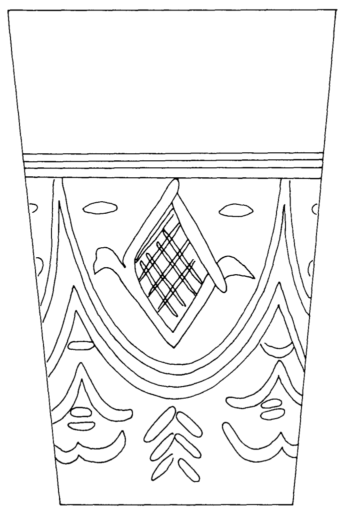


Figure 13. Beaker with wheel-cut decoration, found in Birka, Sweden. Glass, traces of paint. Probably from Iraq or Iran, 9th century. Stockholm, Statens Historiska Museum (SHM-Bj 542). Photograph courtesy of Antikvarisk-Topografiska Arkivet, Stockholm

203. Beaker

Colorless
H. 10 cm; Diam.: at base 4.5 cm, at rim 7.5 cm
10th century
1938; Tepe Madraseh, drain in H4, lower level
Tehran, Iran Bastan Museum 20373





Broken, mended. Flat base, flaring body. Decoration, below horizontal rings, of a wavy band with each loop occupied by a crosshatched lozenge. Below the wavy band various designs made of short grooves. Upper wall above the rings undecorated. The rim probably unpolished.

Reference: Wilkinson, "Water," p. 182.

204. Beaker

Colorless, yellowish green tinge. Slight corrosion; iridescence
H. 10.8 cm; Diam.: at base 5 cm, at rim 7.6 cm; Th. of wall less than 0.1 cm
10th century
1939; Tepe Madraseh, court in X8, next to top level
MMA 40.170.226



Broken, mended; part of wall up to rim missing, now restored. Thick flat base with pontil mark. Some glass of the base lost when the material was still warm. Flaring body. Frieze around the wall consisting of two large lozenges with a crosshatched center alternating with two geometrical or plantlike designs. Uppermost 3 centimeters of the wall undecorated.

This pattern appears on a cylindrical beaker in linear style from Samarra: see Figure 11 (p. 147). Another cylindrical beaker in the intermediate style carrying the same pattern was found at Tell Fakhariyah in Syria (McEwan, *Soundings*, p. 30, pl. 28:6). A smaller cylindrical beaker from the same site (pl. 28:7) is only sparsely decorated and has no parallels among the Nishapur finds. Both were called early Islamic by the excavators.

205. Beaker

Colorless
H. 11 cm; Diam. at rim 7 cm
10th century
1939; Tepe Madraseh, court in X8, next to top level
Discarded



Broken, mended; large part of wall and rim missing. Flat base, flaring body. Double grooves forming squares containing lozenges and plantlike motifs.

206. Beaker

Colorless. Corrosion and iridescence
H. 10.8 cm; Diam.: at base 4.5 cm, at rim 7.5 cm
10th century
1939; Tepe Madraseh, court in X8, next to top level
MMA 40.170.138

Broken, mended. Large part of wall and rim missing, now restored. Flat base with pontil mark, flaring body. Double lines forming a continuous scroll of three ovals, each occupied by a plant or flower, the bud crosshatched. Spandrels filled with chevrons or plants. Upper 3 centimeters of wall undecorated.

A close parallel is a beaker in Berlin with the same design of a continuous scroll but a differently rendered flower bud (K. Erdmann, "Neuerworbene Gläser," p. 34, fig. 7).



206

207. Fragment of a beaker

Colorless
H. 5.7 cm; Diam. 5.1 cm
10th century
1939; Sabz Pushan, 1D adjacent to alley
Discarded



Lower section of beaker. Flat base, part of flaring body. Rectangular panels divided by double lines contain plantlike designs.

208. Fragments of a beaker

Colorless. Incrustation, corrosion
H. 4.4 cm; Diam. at base 4.7 cm; Th. of wall 0.1–0.2 cm
10th century
1939(?); Sabz Pushan, well in 10E
MMA, no number





Two fitting fragments of lower section of a flaring beaker. Flat bottom with pontil mark in center, triangle cut around it. On the wall, below horizontal lines, a zigzag filled with leaflike designs. Remains of a second panel above are evidence of a decoration in horizontal registers.

The empty arch design

Three fragmentary vessels from Nishapur, a bottle and two flaring beakers, carry a motif of empty arches. One of the vessels is of unknown provenance and the other two were excavated in different parts of Sabz Pushan. They are of the typical colorless glass. The design is the same on all three vessels, but the carving varies from very shallow cutting (No. 209), to cuts of medium depth (No. 210), and finally to deeper slant cuts (No. 211) to delineate the arches and capitals.

The arcade of empty arches can be used alone, as on the bottle Number 209, or can be repeated in another register, as it is on the beaker fragments. The semicircular arches rest on columns indicated by double or triple lines and capitals denoted by two horizontal grooves. The spandrels contain diagonal grooves making a chevron pattern. On Number 209 there seem to be two versions of this spandrel pattern.

These examples show that the empty arch design belonged to the standard ornamental repertoire of glass engravers in the Nishapur region. A bottle on which wheel-cut faceted rectangles set off against the shoulder are carved with the empty arch design is probably from Nishapur and hints at the variety of possible treatments of the motif (Jenkins, *Islamic Art... Kuwait*, p. 30). A very different version decorates a beaker of unknown provenance, possibly from Iran (Auth, *Ancient Glass*, no. 229).

In the Near East the decorative arcade usually has a freestanding pillar beneath each arch. This motif occurs on glass finds from Dura-Europos (Clairmont, *Glass Vessels... Dura-Europos*, nos. 275ff., pl. 27) and on a Sasanian beaker (Harden et al., *Masterpieces*, no. 138), which also carries two friezes of empty arches. A variation on the theme is an arcade with facets in the arches (Harper, *Royal Hunter*, no. 79; see also Fukai, *Persian Glass*, pl. 19, and "Recent Important Acquisitions," 1982, p. 89, no. 9; for an example from the fourth century see Harden et al., *Masterpieces*, no. 105). The old design with freestanding pillars in the arches was taken up again by the Islamic glass engravers who carved beakers found in the eleventh-century Serçe Limanı shipwreck (see, e.g., Kitson-Mimmack, "Glass Beakers," p. 62, fig. 10 [BK 17]). One may conclude that both versions of the design—empty arches and arches with pillars—played a part in Islamic art. There is no indication that the motif had any significance other than an ornamental one.

209. Bottle

Colorless
H. 7.5 cm; Diam. 4.6 cm
10th century
1935(?); Sabz Pushan, well in B
Discarded



Body cracked, neck missing. Flat base, flaring wall, and rounded shoulder. Between horizontal lines a frieze of arches. Above, on the shoulder, another register containing ovals.

---

210. Fragment of a beaker

Colorless
H. 6.7 cm; Diam. 4.5 cm
10th century
1939; Sabz Pushan, 4F1
Discarded



210

Broken, mended. Lower section of beaker. Flat base, flaring walls. At juncture of base and wall a band of small oval facets, above that a register containing a colonnade. A second register seems perceptible above, its decoration not legible.

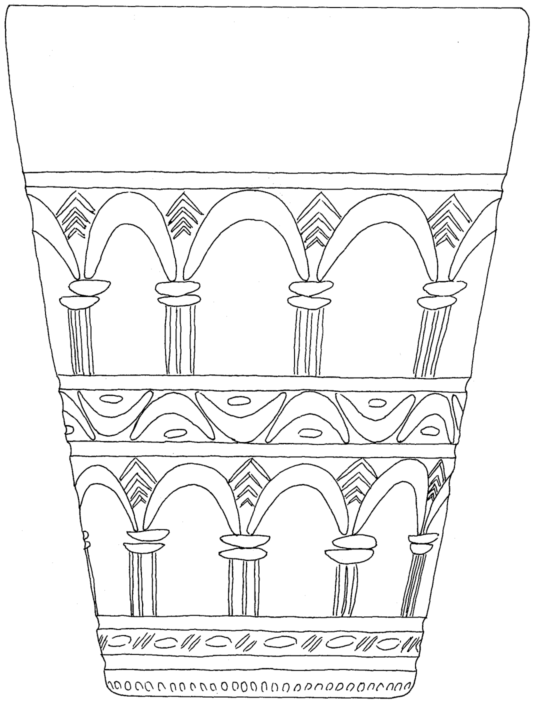
---

211. Part of a beaker

Colorless. Iridescence (now cleaned)
H.: 9 cm, restored 11.8 cm; Diam.: at base 5.6 cm, restored 8.8 cm; Th. at rim 0.1 cm
10th century
1939; exact provenance unknown
MMA 48.101.61

Broken, mended; most of wall missing, now restored to approximation of original height. Nearly flat base, flaring walls. Decoration in several horizontal registers. At juncture of base and wall a band of small oval facets, above that a band containing a two-strand braid. Two wide registers with continuous arcades, separated by a register with a continuous design of rounded zigzags.

Stylistically this beaker is very close to the beaker with a crosshatched design that follows.





211

Cross-hatching

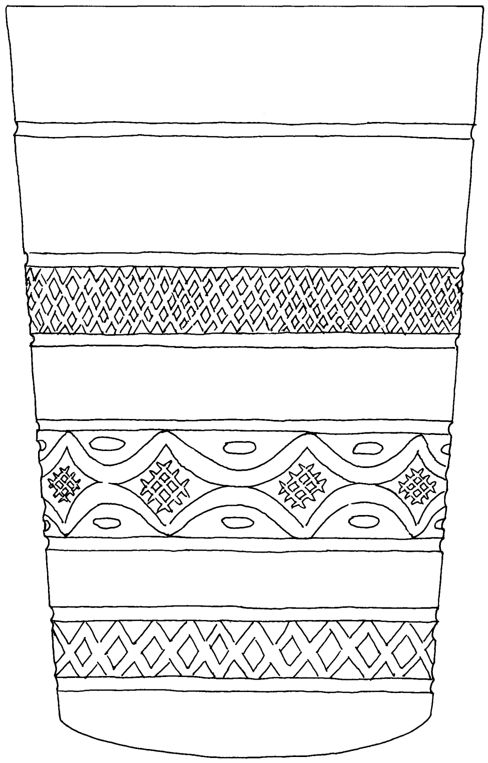
Only a few of the excavated pieces, fragments of beakers and a small bottle, have decoration that is predominantly cross-hatching. They are mostly of colorless glass. The crosshatch pattern fills horizontal or vertical bands. The hatching can be widely spaced or fine, and the carving of varying depths. On the beaker Number 212 some of the carving is executed in slant cuts.

As has been seen, areas of cross-hatching also enliven depictions of animals (Nos. 202, 219), plants (No. 206), or stylized motifs (No. 203). This is the way cross-hatching was previously used in Samarra (Fig. 12, p. 152; also Lamm, *Glas von Samarra*, no. 180, pl. 7). On a rock crystal bowl found at Susa (Harper, *Royal Hunter*, no. 29, probably of the ninth–tenth century), cross-hatching is used to fill an area between two plants. Indeed, the effectiveness of simple patterns with crosshatched lines had already been recognized in pre-Islamic periods (Saldern, *Glas ... Sammlung Hans Cohn*, nos. 77, 79). Cross-hatched patterns also occur on a number of vessels that come out of uncontrolled excavations, although none with bands like those on the beaker Number 212. Use of the pattern on glass seems to have been widespread during the early Islamic period (ibid., nos. 151, 155; Harden et al., *Masterpieces*, no. 142).

212. Part of a beaker

Colorless. Iridescence
H. 10.3 cm; Diam.: at base 5.2 cm, at rim 6.7 cm;
Th. at rim 0.1 cm
10th century
1939; exact provenance unknown
MMA 48.101.55

Broken, mended. Sections remain of base and of wall up to rim. Now restored to original height. Rounded base, the center ground flat, obliterating pontil mark. Flaring walls. Horizontal registers of decoration, from bottom to top: band of large cross-hatching; undecorated band; wide band with opposed semicircles, rhomboidal interstices filled with cross-





212

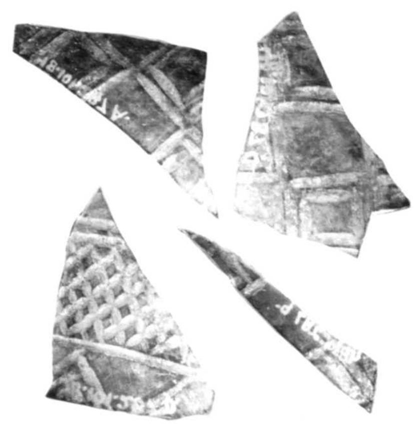
hatching; undecorated band; finely crosshatched band; two undecorated bands separated by a horizontal line. Walls very thin.

---

213. Fragments of a vessel

Colorless. Iridescence
L. of largest fragment 3 cm; Th. of wall 0.1 cm
10th century
1939(?); exact provenance unknown
MMA 48.101.287a–d

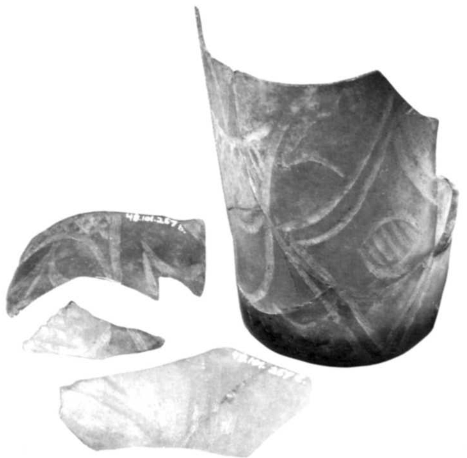
Four vessel sherds with patterns of lozenges and cross-hatching.



---

214. Parts of a beaker

Colorless, yellowish green tinge
H. of joined section 7.5 cm; Diam. at base 4.3 cm;
L. of longest separate fragment 5.3 cm
10th century
1939(?); exact provenance unknown
MMA 48.101.267a–d



214

Base with three fragments now joined to it; three small additional fragments. Straight flaring walls, flat bottom, thick base with pontil mark. Thin walls. Decoration of double-outlined lozenges with cross-hatched lens shape in center; curvilinear motifs with cross-hatching between lozenges. Above a double horizontal line, upper part of wall undecorated.

---

215. Fragments of a beaker

Colorless
L. of largest fragment 2.5 cm; Th. 0.1 cm
10th century
1939(?); exact provenance unknown
MMA 48.101.283a–d

Four tiny fragments, probably from the wall of a beaker.

---

216. Bottle

Gray(?) and opaque white caused by decay
H. 5.5 cm; Diam. 2.3 cm
10th century
1937; Village Tepe
Tehran, Iran Bastan Museum

Complete. Small ovoid bottle. Rounded base with pontil mark. Short, ringlike neck. On the wall vertical bands alternately undecorated or with cross-hatching.

Compare Saldern, *Glas... Sammlung Hans Cohn*, nos. 151, 152.



216

The coarse style

Rather different from the other beakers unearthed at Nishapur are two beakers from Tepe Madraseh carved in a style that can be characterized as coarse. Coarse-style decoration consists of shallow, carelessly cut lines that supply little more than the barest outlines of a motif. The glass cutter's task was obviously to create a design with a minimum of labor, possibly in order to keep the cost low.

It is difficult to say whether the beaker Number 217 belongs even in this category, because its decoration is nothing more than unevenly cut grooves. One may speculate about the reasons for such careless work: perhaps the irregularity was not intentional or the glasscutter found a flaw in the vessel and abandoned the project. However, the beaker was not immediately recycled but instead found its way to a customer (which suggests that it was manufactured locally). As the finds from Dwin and from the Serçe Limanı wreck show, beakers with a simple

decoration of horizontal grooves were quite common in the Islamic world (Janpoladian, *Medieval Glassware*, figs. 46, 47; Kitson-Mimmack, "Glass Beakers," pp. 48–59).

The second beaker, Number 218, is carved with a frieze of triangles filled with plantlike and possibly animal motifs. The decoration is rendered in such an abbreviated form that it is hardly possible to give an exact description. The stylizations seem to go one step further than those on a beaker decorated in the slant-cut style (Saldern, *Glas... Sammlung Hans Cohn*, no. 148).

It seems very likely that coarse-style carving was executed in the same glasshouses that produced the more developed styles. It probably was offered as an alternative type of ware to meet the demand for inexpensive products. As the excavations have not yielded many examples in the style, there is little basis on which to speculate further. A number of vessels from uncontrolled diggings decorated in a related sketchy style are evidence that work of this type was widely distributed (*Glass... Smith Collection*, nos. 570, 572; *2000 [Zweitausend] Jahre*, no. 67; Harden et al., *Masterpieces*, no. 143; Hasson, *Early Islamic Glass*, p. 13, fig. 21; Kröger, *Glas*, no. 190).

Christoph Clairmont has suggested that works in this style are early, dating from the eighth or ninth century ("Some Islamic Glass," no. 11). However, on the evidence of the excavated Nishapur beakers in coarse style—including their findspots and the relation of their shapes and decoration to those of other cut glass pieces—I believe that vessels in the coarse style were contemporary with the vessels in other styles.

217. Beaker

Colorless, greenish tinge. Weathered, iridescence (now cleaned)
H. 10.3 cm; Diam.: at base 4.5 cm, at rim 7.4 cm
10th century
1938; Tepe Madraseh, drain in H4, lower level
MMA 39.40.43



217

Broken, mended. A number of pieces missing, now restored. Flaring wall, flat base (chipped) with pontil mark. A single horizontal line encircling the lower wall, a pair of slightly irregular lines below the rim.

218. Beaker

Colorless, greenish tinge. Iridescence (now cleaned)
H. 10.7 cm; Diam.: at base 4.4 cm, at rim 7 cm;
Th.: at base 0.5 cm, at rim 0.1 cm
10th century
1938; Tepe Madraseh, drain in H4, lower level
MMA 39.40.44



Broken, mended; large sections of wall missing, now partly restored. Thick flat base with pontil mark, a small part of the base lost, probably when the material was still warm. Flaring body divided into two rectangular panels, each with a large double-line V that cuts the field into triangles. In the central triangles plantlike motifs; in flanking triangles stylized birds, much simplified. Double line separates panels from the undecorated rim (2.8 cm high).

VESSELS IN THE SLANT-CUT STYLE

Vessels in the slant-cut style display not only hollow-cut lines that are U-shaped in cross section, the type seen in the linear and intermediate styles, but also broad, slanting cuts with a cross section like a check (✓). The slant cuts have particular visual qualities, and thus characteristic designs are associated with the technique. The term *beveled* has often been applied to this style, but, as will be shown, there is no common understanding of that word's use.

Glass vessels of a very pronounced slant-cut style have been linked to the so-called beveled style of carving in stucco, wood, and stone practiced in Samarra during the ninth century. In 1952 Richard Ettinghausen demonstrated that the basic features of the beveled style survived into the fourteenth century. He was able to cite many examples of architectural decoration with those features, but he also chose two glass vessels said to be from the Gurgān region to emphasize that the style occurs in glass as well (Ettinghausen, "'Beveled Style,'" pp. 80–81, pl. 15: 3–4). He also gave a definition of the beveled style: "In it a series of identical designs are delineated and at the same time separated from each other by various types of curved lines with spiral endings; occasionally, small marginal notches, short slits, dots, and applied surface decorations are added for further accentuation. The designs are purely abstract, although Herzfeld has pointed out that they derive from border designs of Hellenistic architecture and from floral forms such as acanthus, buds, flowers and rinceaux. The sense of complete stylization is enhanced by another characteristic feature, the slant style of carving, that is, the beveling of the surface toward the curved outlines of the design, which creates a sculptured plane with a soft, flat modulation. The total impression is that of a uniform, abstract pattern with no background between the individual designs" (ibid., p. 73).

Although use of the term *beveled style* for glass was accepted by most scholars, there seems to be no general understanding about its actual meaning. Most scholars followed the definition, not unlike Ettinghausen's, given by Ralph Pinder-Wilson: the cutting "resembles the so-called 'bevelled' style represented in the carved stucco work at Samarra: this is characterized by the absence of a second plane providing the background to the decoration and by the defining of the elements by outlines cut at a slant" (Pinder-Wilson, "Cut-Glass Vessels," p. 37).

While a relationship between the architectural style and the glass style is evident, confusion arises because the patterns on the glass vessels are unlike the repetitive patterns typical for the beveled style in architecture. Therefore I propose use of the term *slant-cut* for the glass under discussion.

Nine of the ten vessels or vessel fragments of this group are from findspots in Tepe Madraseh. Wells or drains in the rooms H4, S8, and X8 yielded eight of them. The glass is almost always colorless; only the neck of Number 226 has some color, being colorless but with a yellowish brown tinge. Six of the vessels are flaring beakers. Two different kinds of bottles and a jug were also found, vessel types that do not appear in the linear or the intermediate style. Conversely, cylindrical beakers are not found in the slant-cut style; it may well be that they had gone out of fashion by the time the slant-cut style became widely used. The art market has yielded a shallow plate (Ohm, *Europäisches . . . Glas*, no. 71) and a flattened ellipsoid bottle (Fig. 14) in this style. Much of the cut and engraved glass found at Nishapur belongs to the intermediate as well as the slant-cut style. Since many findspots contained vessels in both styles, the two styles must have been in use at the same time. Perhaps the

excavated areas are in sections of the city that had been abandoned before slant-cut became the dominant style.

As part of the preceding intermediate style, slant cuts had gradually come into use to decorate a variety of vessels. Usually the slant cuts were semicircular and appeared as isolated features. In the slant-cut style, however, the slanted cuts play a much more prominent part, now decorating whole areas of the vessels. Semicircular slant-cuts are joined to form continuous bands (Nos. 227, 228) or are transformed into continuous motifs (No. 221) or separate wavy elements (No. 223). Cross-hatching is apparently used only to define certain parts of animals (Nos. 219, 228). Parallel outlines, chevron patterns (No. 227), and parallel cuts are typical. A prominent feature is a large, isolated, stylized palmette with diagonal parallel lines cut on the borders. Unlike palmettes in the relief-cut style, these are displayed horizontally or vertically (Nos. 222, 223) and without the half-palmettes that used to be part of the motif. A stylized version of a continuous scroll consists of an isolated S form with half-palmettes (No. 225). Animals are also part of the repertoire (Nos. 219, 228, perhaps 220). Designs tend gradually to take over the entire area, obliterating the background (compare Nos. 224 and 225).

The slant-cut style is not homogeneous: the few vessels in the style show obvious differences, and their origin in different workshops can be assumed. The variations are evident between vessels from different findspots, such as the beakers Numbers 223 and 224 or bottles Numbers 225 and 227. However, the beakers Numbers 222 and 223, which are from the same findspot (the well in S8), show closely related decorative motifs and a similar way of executing the slant cut. There can be no doubt that they were made in the same glasshouse, and probably they were cut by the same artist. In general, variations among the slant-cut vessels are very likely due to their





Figure 14. Bottle decorated in the slant-cut style, two views. Glass. Iran(?), 9th–10th century. Athens, Benaki Museum (3338)

execution by diverse craftsmen, not to differences in place or date of origin.

A bottle in the Benaki Museum in Athens (Fig. 14), which Christoph Clairmont regards as an important example in the "beveled" style, is close to the Nishapur finds and shows all the characteristics of the slant-cut style in the plant and animal design of its lowermost and central registers. It has been tentatively dated to the ninth to tenth century (Clairmont, *Benaki Museum*, no. 323, fig. 10, pl. 20). However, as Clairmont noted when cataloguing the vessel, the rosettes in the upper registers and the diaper design on the narrow sides are not attested elsewhere and in style differ greatly from slant-cut decoration. Therefore this bottle, while showing definite similarities to the Nishapur finds, seems to have been made in a different glassworking center. It remains an open question whether this stylistic eclecticism and the crudeness of the workmanship point to the bottle's origin in a workshop where the slant-cut style of Nishapur was imitated. The workshop could have been located elsewhere, perhaps even outside of Iran.

The bottle had already been mentioned by R. J. Charleston ("Group of... Glasses," p. 216) in connection with a beaker fragment in Stockholm said to come from Rayy and also with the well-known Buckley bottle (Fig. 15) in the Victoria and Albert Museum (ibid., pl. 1c; Buckley, *Art of Glass*, p. 242, pl. 10; Pope, *Survey*, pl. 1442A). Charleston noted a striking resemblance between the Stockholm beaker and the Buckley bottle; the style in which they were worked he called simply wheel-engraved. He assigned to the Stockholm beaker a date of the second half of the ninth to the first half of the tenth century and thought the bottle had been made a little later. These are the earliest examples of the slant-cut style that had come to light before the Nishapur excavations. They closely parallel the beaker Number 223 and show the typical features of the slant-cut style.

In 1961 Kurt Erdmann published a beaker, said to have come from Iran, with a design of counterposed palmettes executed in slant-cutting (K. Erdmann, "Neuerworbene Gläser," p. 34, fig. 4; *Arts of Islam*, London, no. 124). Some plain areas have additional incised diagonal hatching or cross-hatching, and the beaker's design departs from the slant-cut style known from the Nishapur finds and similar works. A bottle usually regarded as Egyptian glass shows related characteristics and may therefore also be from Iran (Lamm, *Mittelalterliche Gläser*, p. 168, pl. 61: 24). However, how widespread the slant-cut style was, where it originated, and how the patterns and execution differed from region to region are all open questions.

Rachel Hasson used the term *beveled* in connection with mold-blown glass vessels of the ninth to tenth century which indeed carry designs closely related to the Samarra style, making the suggestion of a relationship entirely reasonable. In fact, some mold-blown glasses come much closer than wheel-cut pieces to the beveled style as it occurs among the Samarra

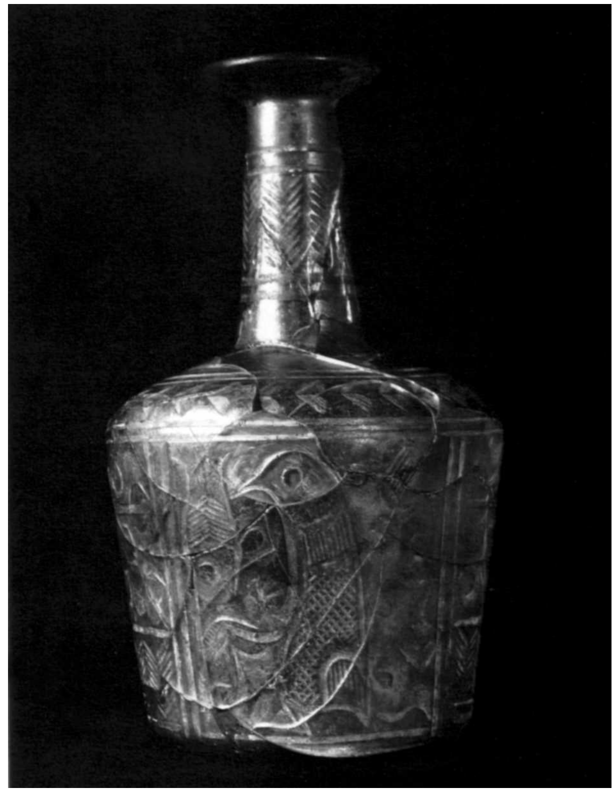


Figure 15. Bottle from the Buckley Collection, decorated in the slant-cut style. Glass. Iran, 10th century. London, Victoria and Albert Museum (C.127-1936). Courtesy of the Board of Trustees of the Victoria and Albert Museum

finds (Hasson, *Early Islamic Glass*, pp. 18–19). The term *beveled* actually much better describes this group of molded vessels, since they show both deep outlining of the pattern and beveling of the surface (see Nos. 133, 134). In this group repeating designs can also be found, although the motifs are seldom as abstract as the ones in architectural ornament.

In 1986 Marilyn Jenkins described the beveled style as being in the process of evolution: "By the middle of the eleventh century, the trend toward stylization begun in the preceding hundred years had led to a totally bevel-cut decoration with no foreground or background." She dated vessels such as the beaker Number 223 on the basis of finds from the Serçe Limanı shipwreck of the first half of the eleventh century (Jenkins, "Islamic Glass," pp. 28–29). (I have already given my opinion that glass vessels from Nishapur cannot be dated on the evidence of the Serçe Limanı glass.) Joy J. Kitson-Mimmack rejected this proposed date, writing that "the appropriateness of the use of this term [bevel-cut] in relation to vessels in this assemblage is open to question. No evidence of bold slanting occurs in the Serçe Limanı beaker collection.... In actuality, the slanted grooves on the Serçe Limanı beakers are cut no deeper than the average hollow-cut groove" (Kitson-Mimmack, "Glass Beakers," p. 188). A number of beakers from the Serçe Limanı wreck (ibid., BK 48, 50, 53, 56) display volutes executed in a slant-cut style related to slant-cutting on the Nishapur vessels Numbers 222, 223, and 227. In my view, this may perhaps be taken as evidence that before 1025 the slant-cut style was a widely used, international style. At the same time, the very great differences between glass finds from Nishapur and from the Serçe Limanı wreck show clearly that there was only faint knowledge of the current Iranian glass styles in the glasshouses on the Syrian coast.

R. J. Charleston recently drew attention to a relief-cut vessel with oblique cuts on which "the design is left in relief without being bounded by a raised outline." He connected this piece with the beveled style, although it differs greatly from vessels usually associated with the beveled style and probably should be regarded as being in one of the relief-cut styles (Charleston, "Glass," p. 302). Once again it is very evident that there is no common understanding of what constitutes the beveled style on Islamic glass vessels.

The main feature of the Samarra beveled style of carving in stucco, wood, and stone is a "uniform abstract pattern with no background between the individual designs." This feature does not appear on most glass vessels, and certainly not on the Nishapur finds. It is also of interest that this style seems not to have played much part in architectural decoration in those parts of the city excavated by the Nishapur expedition. Only one fragment can be cited that may reflect the beveled style. Wilkinson assigned it a twelfth-century date (*Nishapur:... Buildings*, pp. 127–28, fig. 1:134). As early as 1975, Oleg Grabar had thought that the beveled style "does not seem to have affected Iran to any great extent" (O. Grabar, "Visual Arts," p. 351).

Whether the slant-cut style was influenced by the beveled style known from architectural decoration in Samarra is a question that still needs further research. The slant-cut style does exist on glass from Samarra, since an excavated fragment shows all the main features of the style: slant and linear cuts, parallel cuts ranged horizontally or diagonally, and vegetal motifs (*Excavations at Samarra*, pl. 121, bottom). Therefore it is possible that the style had a certain popularity in Iraq and from there spread to influence other glasshouses, for instance in Dwin, where an example was found—if it is not itself an import (Janpoladian and Kalantarian, *Trade Relations*, pl. 16). Thus, slant-cut probably became an international style with varying regional interpretations. The Nishapur finds show several stages of this process of local adaptation, which took place during the tenth century.

219. Beaker

Colorless
H. 9.9 cm; Diam. approx. 7 cm
10th century
1939; Tepe Madraseh, W6, low level
Tehran, Iran Bastan Museum 3943



Broken, mended; sections of upper wall missing. Flat base, flaring body. Body divided into two rectangular panels by double lines; upper part of the wall undecorated. On one panel the forepart of an animal facing left, with the lower part crosshatched and a herringbone pattern on the neck. In the space to the left of the animal, circlets with a central disk and leaflike forms. Second panel largely missing.

Comparison with a number of published vessels suggests that the animal represented is a bird. A similarly rendered bird decorates a beaker in Berlin (Fig. 16), along with a winged horse (K. Erdmann, "Neuerworbene Gläser," fig. 5; H. Erdmann, *Iranische Kunst*, pl. 32A). This type of bird also appears on the bottle formerly in the Buckley Collection (Fig. 15). Related to these is a fragment of a beaker bearing quadrupeds, in Stockholm (Charleston, "Group of... Glasses," pp. 212ff., fig. 1, pl. 1 A–B).

In all these examples, the decoration shows characteristic features of the slant-cut style. The animals—whether rendered with a single outline, as they are on the Buckley bottle, or with a double outline, as on the other vessels—are always highly stylized. Major areas of the bodies are crosshatched; the necks display parallel hatching (Buckley bottle) or, more usually, a herringbone pattern. The cross-hatching links these animals to the quadrupeds on the Benaki bottle, another work in the slant-cut style (Fig. 14), and also to

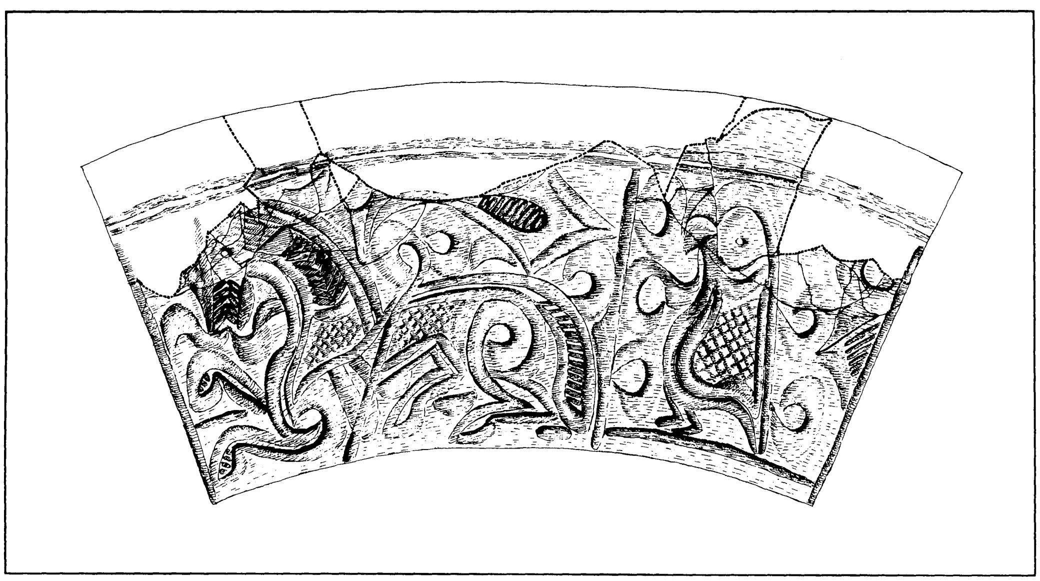


Figure 16. Drawing of the wall of a beaker decorated in the slant-cut style. Glass. Iran, Nishapur(?), 10th century. Berlin, Museum für Islamische Kunst (I.22/61)

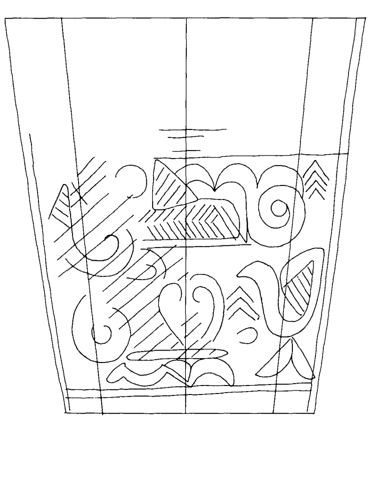
the birds on the intermediate-style beaker Number 202. Differences among the various examples of animals in this peculiar style are probably due to the artists' differing abilities.

A variety of dates have been proposed for these vessels. Charleston dated the Stockholm beaker fragment to the second half of the ninth or first half of the tenth century and thought the Buckley bottle was somewhat later. In 1955 Saldern dated the Buckley bottle to the late tenth or eleventh century ("Islamic ... Cup," p. 269). The Berlin beaker was assigned a ninth-to-tenth-century date by Kurt Erdmann and the Benaki bottle a similar date by Clairmont (Clairmont, *Benaki Museum*, no. 323). On the strength of both evidence from Nishapur and external evidence, a date in the tenth century is here proposed.

The use of cross-hatching in stylized depictions of animals also occurs on glass vessels from Iran in a coarse style (Saldern, *Glas... Sammlung Hans Cohn*, no. 152). The practice apparently spread across the Islamic world; such hatching can be found on vessels from Sabra in Tunisia (Smith, "New Finds," p. 98, fig. a) and from the Serçe Limanı wreck (Bass, "Nature of the Serçe Limani Glass," fig. 2a–b).

220. Beaker

Colorless
H. 10.5 cm; Diam. at base 4.4 cm
10th century
1938; Tepe Madraseh, drain in H4, lower level
Tehran, Iran Bastan Museum





220

Broken, mended; large sections of wall missing. Flat base, tapering body. Frieze banded top and bottom by horizontal lines. Decoration almost illegible: possibly highly stylized depictions of plants and birds. Upper wall undecorated.

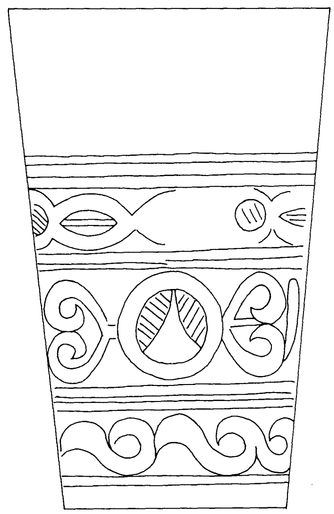
221. Beaker

Color unknown
H. 10.5 cm; Diam.: at base 4.9 cm, at rim 7.1 cm
10th century
Excavation year and exact provenance unknown
Discarded

State of preservation not known; probably large parts of vessel missing. Flat base, flaring wall. Decoration (known only from drawing) consisting of three horizontal bands separated by single or double grooves. In the lowest band, wavy shapes; in the central one a medallion flanked by stylized leaves; in the upper band perhaps a succession of circles and ovals.

Although a number of details are uncertain, the major points of this decorative pattern cannot be questioned. The decoration obviously consisted of three horizontal bands, of which the central one was paramount. The lower band offers the only example among the finds of volutelike forms arranged in a sort of wavy band. The upper band seems to have been a continuous frieze formed of two different elements. The middle band had a medallion flanked by two palmettes. A medallion pattern is found in differing versions on a number of Iranian bottles usually said

to be from Nishapur (see Saldern, *Glas... Sammlung Hans Cohn*, no. 158, and the very closely related pattern on a bottle in Schlosser, *Alte Glas*, p. 60, fig. 49).



221

222. Beaker

Colorless
H. 11 cm; Diam. at base 4.3 cm
10th century
1939; Tepe Madraseh, well in S8
Discarded



Broken, mended; large sections of wall missing. Flat base with flaring body. On the body a frieze with a palmette and part of a roundel; probably two palmettes alternated with two roundels containing rosettes. The space in between filled with half-palmettes formed by wavy or S-shaped cuts typical for the slant-cut style. Upper part undecorated.

For a related beaker with a frieze with alternating rosettes, see Saldern, *Glassammlung Hentrich*, no. 401. Comparison with the much larger beaker Number 223, which has the same findspot, suggests that both were cut by the same artist. In both, the palmette is not isolated but is linked by a deep groove to adjoining elements of unclear nature.

223. Beaker

Colorless. Iridescence
H. 15.4 cm; Diam.: at base 7.6 cm, at rim 11.2 cm; Th. at rim 0.1 cm
10th century
1939; Tepe Madraseh, well in S8
MMA 40.170.55

Broken, mended; large parts of wall missing, now restored. Thick flat base with semicircle cut away in center surrounded by engraved triangle. Flaring body with narrow undecorated strip at foot and wider undecorated strip at rim. Between the strips a decorated zone divided into two rectangular compartments, one filled with a large central palmette surrounded by wavy bands. The other compartment divided into two registers, the lower one filled with a row of oblong panels and the upper one with two confronted palmettes. On all the palmettes, sections hatched with parallel vertical or diagonal lines.

Reference: Jenkins, "Islamic Glass," no. 28.

The large, stylized, heart-shaped palmette leaf cut with parallel lines around its borders, which appears once on the beaker Number 222 and twice on this large beaker, is a leitmotif of the slant-cut style. It can be thought of as an isolated motif that derived from the more complicated "tree of life" image, illustrated on the ninth-century ibex cup in Corning (Fig. 9, p. 141) showing a stylized tree flanked by two birds. As Saldern has shown ("Islamic... Cup," pp. 257ff.), that tree consists of two volutes joined to form a





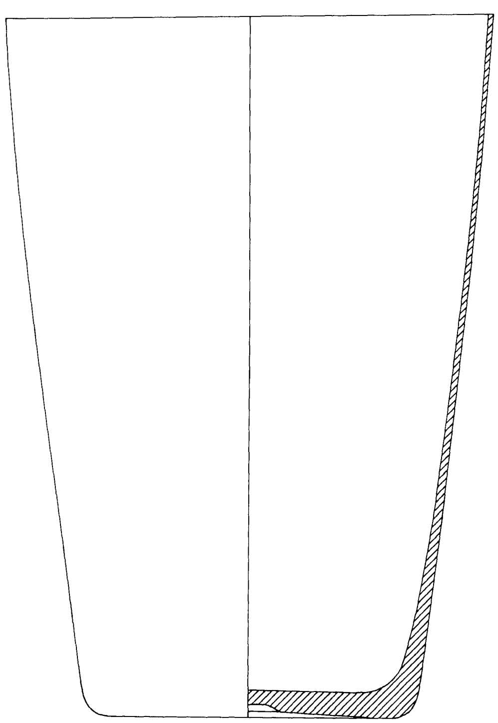
223

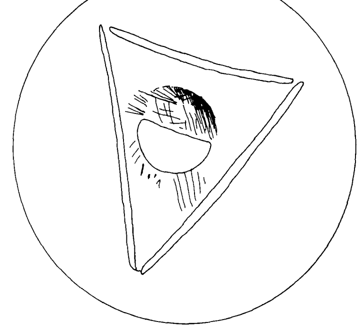
stem. At its center it is bisected by a disk, and it is crowned by an upright, arrow-shaped, stylized palmette leaf. The same motif was known in Egypt and occurs on two rock crystal flasks (Lamm, *Mittelalterliche Gläser*, p. 205, pl. 71:1–2), but in a different style.

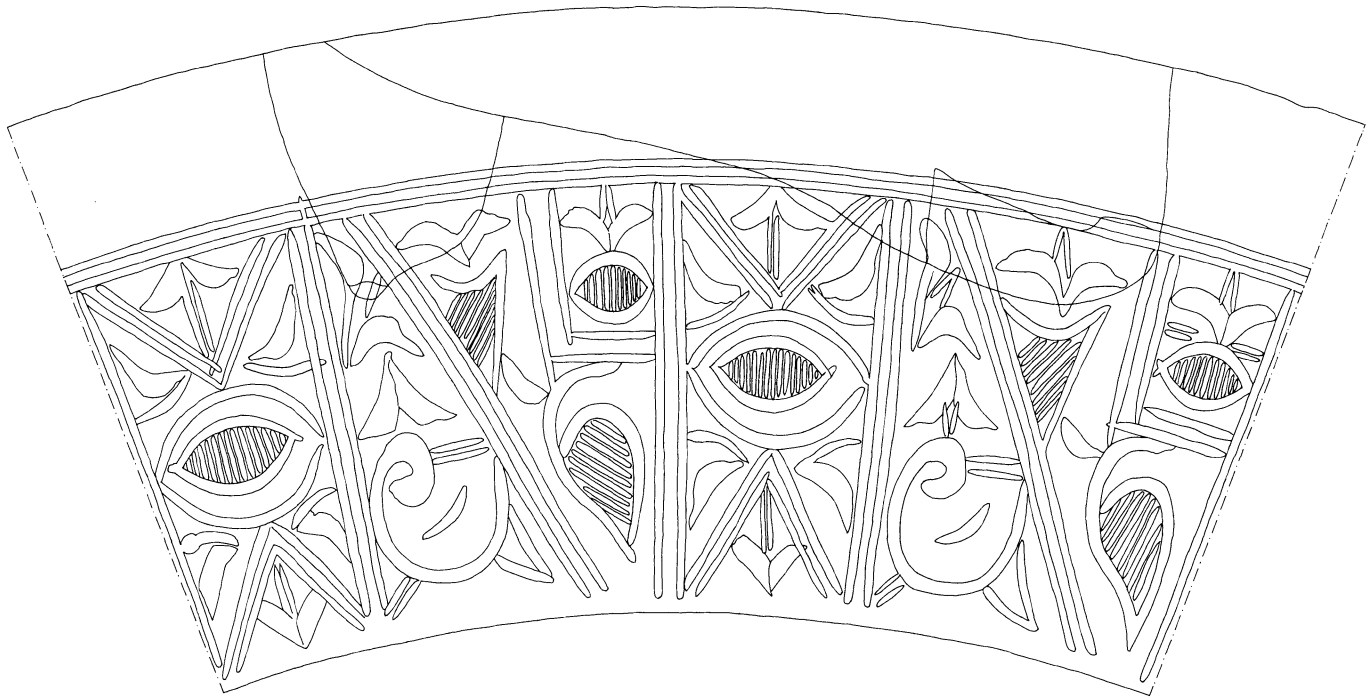
In its progress from the relief-cut to the slant-cut style, this fanciful tree underwent changes, already apparent on an Iranian relief-cut bowl in the British Museum (Harden et al., *Masterpieces*, no. 146; Scanlon, "Note on... Trade," p. 268, fig. 2) and subsequently to be seen on the Benaki bottle, where the leaf is attached to two half-palmettes at the base (Fig. 14, p. 162). The central disk has disappeared. On the slant-cut vessels excavated in Nishapur the leaf and the volutes have been separated, a transformation signaled earlier by the appearance of a single, separate leaf in the lowest register of the Benaki bottle. On Number 223 the motif is dealt with freely, with the leaves arranged in different directions.

The excavation yielded no find on which the palmette leaf is the only motif of a frieze, as it appears, for example, on two bottles, one published by Richard Ettinghausen ("'Beveled Style,'" pp. 80–81, pl. 15:3) and the other by Axel von Saldern ("Sassanidische... Gläser," pp. 53, 54, fig. 12). The latter, in Hamburg, shows a different kind of heart-shaped palmette with a crosshatched top—a type, also found on other vessels (*7000 Years*, no. 608), that can clearly be derived from the palmette on relief-cut vessels like a cup in Berlin (Kröger, *Glas*, no. 193). On vessels with largely linear-style decoration, this type of palmette appears in a continuous frieze (H. Erdmann, *Iranische Kunst*, pl. 29, and compare a beaker, pl. 32c). Both this type and the heart-shaped palmette with parallel lines cut around the borders were common on rock crystals, probably cut in Egypt, as, for instance, a bottle in Halberstadt (R. Schmidt, "Hedwigsgläser," pp. 67, 68, fig. 16; Lamm, *Mittelalterliche Gläser*, p. 197, pl. 67:12). A small glass cup excavated in Fusṭāṭ and dated to the ninth century provides another example of the heart-shaped palmette, demonstrating the range of stylizations of this motif (Pinder-Wilson and Scanlon, "Glass... Fustat: 1964–1971," no. 21). An unpublished Egyptian fragment in Berlin is further evidence that the motif was widely used in Egypt, where it had a very different character from the Iranian versions.

Thus it is possible to follow the gradual changes in the tree of life motif and its components as they were transformed from a unified ensemble into single motifs integrated into new constellations.











224

224. Beaker

Colorless
H. 14.4 cm; Diam. at base 7.7 cm
10th century
1939; Tepe Madraseh, well in X8, second level
Tehran, Iran Bastan Museum

Broken, mended; large parts missing. Beaker similar in shape and decoration to Number 223. Decoration consisting of designs in a wide and a narrower rectangular panel, each panel appearing twice. Panels filled with plant forms, mostly trefoils; possibly, stylized animals; and vertical and diagonal parallel lines. Topmost zone of the beaker undecorated.

Reference: Wilkinson, "Water," p. 182.

This large beaker illustrates well a variety of treatments in the slant-cut style. The design of rectangles of different sizes, the division into triangles, and the motifs filled with parallel lines, such as the almond shapes, find their closest match in a vessel fragment from Samarra (*Excavations at Samarra*, pl. 121, bottom). Thus it is probable that the slant-cut style on vessels found in Nishapur was influenced by Samarra glasswork, as seems also to have been the case with other styles.



225

225. Bottle

Colorless. Slight iridescence
H. 6.1 cm; Diam. 10 cm
10th century
1939; Tepe Madraseh, well in X8, second level
MMA 40.170.129

Broken, mended; neck and sections of body missing, now restored, bringing bottle to approximately original height. Globular body on flat ring base. Pontil mark in center of base removed by cutting a small circle filled with parallel lines; short radiating cuts around footring. Between a single groove above base and a double groove on the shoulder, a frieze with three medallions each containing a rosette of four heart-shaped leaves. Between the medallions, S-shaped stems end in large half-palmettes with hatched leaves.

Reference: Wilkinson, "Water," p. 181.

226. Neck of a bottle

Colorless, yellowish brown tinge. Corrosion, iridescence
H. 9.7 cm; Diam. 2.5 cm
10th century
1939; Tepe Madraseh, well in X8
MMA 48.101.263



Broken, mended; small pieces missing. Cylindrical neck from a bottle similar to Number 225. Herringbone pattern between horizontal double lines.

For the herringbone pattern see the Buckley bottle (Fig. 15, p. 163), Lamm, *Glass from Iran*, pl. 38D, and Abdurazakov et al., *Steklodeliye Srednei*, fig. 16:5 (from Khulbuk), to name just a few examples.

The fragmentary bottle Number 225 and the neck Number 226 were found at the same site and probably belong to the same type of bottle. Their glass composition differs (see appendix 1), so the two fragments must belong to different vessels. However, the bottle type they represent seems to have been a standard item, since three nearly identical or at least very similar bottles are known. Common to all is a globular body with a flat ring base and a cylindrical neck decorated with a herringbone pattern (compare No. 227). The average height of these bottles is 16 centimeters. They are worked with great care, and the center of the base is usually decorated on the spot where the pontil mark originally was. The bottles' decorative schemes are similar, featuring medallions with heart-shaped rosettes or quatrefoils alternating with half-palmettes attached to S-shaped stems (*Tribute to Persia*, Corning, no. 29; Pal, *Islamic Art*, no. 369; Saldern, *Glassammlung Hentrich*, no. 411). The motif of the heart-quatrefoil can be traced back to Sasanian art, where it appears in many variations, usually with additional leaves (see Kröger, *Sasanidischer Stuckdekor*, pp. 59, 100, 112, pls. 42:3, 63:1, 75:2, 86:3, 94:2; also Harper, *Royal Hunter*, no. 51). An isolated stem ending in a half-palmette is a typical feature of early Islamic art and part of the repertoire of architectural ornament (Kröger, op. cit., pl. 91:2). The motif must be seen in connection with complete palmette leaves (see No. 223).

The design on the body of Number 225 is characteristic of high-quality slant-cutting. Its execution too makes this vessel one of the more sophisticated works found at Nishapur.

---

227. Large bottle

Colorless
H. 22.5 cm; Diam. 13.5 cm
10th century
1938; Tepe Madraseh, well in H4, lower level deep
Tehran, Iran Bastan Museum 3294

Broken, mended. Numerous pieces missing, mainly from body of vessel. Flat base, flaring body, tapering neck with flat rim. Body decorated with four(?) rectangular panels, two containing a lozenge and the other two a small rectangle, both motifs surrounded by wavy shapes. Panels framed by borders with crescents or hatched with horizontal, vertical, or diagonal





227

lines. Around the shoulder, bands of large or small chevrons; small chevrons around the neck between double lines above and below.

References: Hauser and Wilkinson, "Museum's Excavations," p. 106, fig. 34; K. Erdmann, "Fatimidischen Bergkristallkannen," p. 195, fig. 59; *Illustrated London News*, April 1, 1944, p. 388.

The entire body and shoulder of this bottle are decorated. The design makes extensive use of patterned borders, leaving relatively little space for the panels they frame. The borders contain three different types of patterns: a herringbone pattern of varying size and spacing; rows of short cuts set horizontally, vertically, or diagonally; and crescent shapes arranged in a continuous horizontal band. Crescent cuts also appear on the neck of Number 228, a ewer from the same findspot, indicating that the motif was in the repertoire of a Nishapur glasshouse. The panels on the bottle contain a lozenge and a small rectangle surrounded by the numerous slant cuts typical for this style. All these decorative elements combined give the bottle its own distinct design quality: it represents one of the many variants of the slant-cut style. (The ewer Number 228, despite the crescent engravings on its neck, differs in style.)

There are a number of bottles of similar shape, with a rounded shoulder and the neck ending in a flattened rim as here. Usually called "mallet-shaped," they are about 24 centimeters high. Close parallels include the Buckley bottle (Fig. 15, p. 163); although the motif of its main frieze is different, it also shows double lines bordering the friezes, and the pattern on the shoulder and neck is identical. Somewhat similar are two other vessels, a cameo bottle in Copenhagen (Leth, *Davids Samling*, p. 20; *Arts of Islam*, London, no. 128; Folsach, *Islamic Art*, no. 219) and an emerald green glass bottle in Hamburg with engraved decoration in eight panels, which has, however, a facet-cut neck (Saldern, "Sassanidische... Gläser," p. 54, fig. 13). A number of bottles are related to Number 227 in shape but are decorated differently, usually with a linear-cut design (H. Erdmann, *Iranische Kunst*, pl. 30). The most important of them is a large bottle from China (H. 25.2 cm), datable to the early eleventh century because it comes from the tomb of Princess Chenguo (An Jiayao, "Dated Islamic Glass," p. 130, fig. 12, p. 131). Most have a faceted neck (also compare Nos. 171 and 172).

A neck carrying the herringbone pattern and surmounted by a flattened rim was found in Samarra (Fig. 17). However, the neck is from a much smaller bottle, and the herringbone pattern is engraved far more deeply and accurately than it is on the Iranian examples (Lamm, *Glas von Samarra*, no. 184). The pattern is tightly drawn, creating the impression of continuous wavy bands. In contrast, the herringbone pattern on the two Nishapur bottles Numbers 226 and 227 has a wide space left between the separate cuts. A herringbone decoration on the neck of a bottle seems to accompany a design on the body in any of the contemporary styles; in other words, as with the facet-cut necks, there is apparently no definite style to which this pattern belonged. The herringbone pattern is of course widely known from Roman glass, where it often circles the shoulder of a vessel (Clairmont, *Glass Vessels... Dura-Europos*, no. 276, pls. 7, 27). The pattern, it seems, continued to be used on Sasanian glass and from there was taken up in the early Islamic period. In Nishapur it occurs not only on glass but also on painted pottery (Wilkinson, *Nishapur: Pottery*, p. 45, no. 62a–b, p. 202, no. 46b).

Designs that feature a division into panels had already appeared on late Roman glass finds from Dura-Europos (Clairmont, op. cit., nos. 299, 304, pls. 28–29), where nearly all the border patterns were also used (ibid., nos. 273, 275, 276, 304, 305, pls. 27–29). Panels with decoration are less common on Sasanian glass, but probably the format survived through the Sasanian period and thus reached the Islamic period.

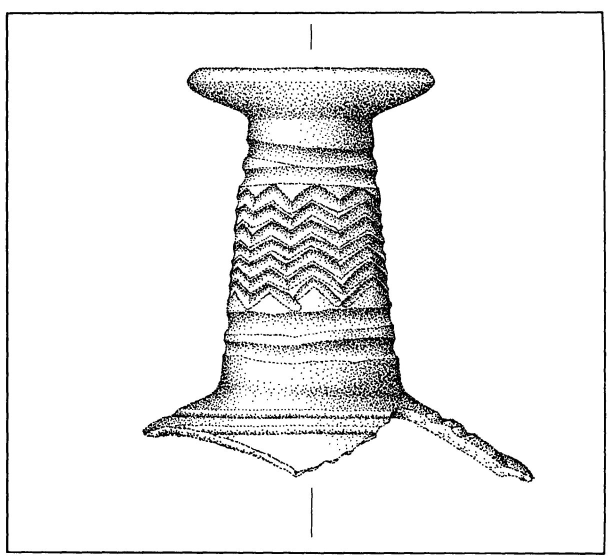


Figure 17. Neck of a bottle decorated with a herringbone pattern. Glass. Samarra, Iraq, 9th century. Berlin, Museum für Islamische Kunst (Lamm, *Glas von Samarra*, no. 184)

228. Jug

Colorless. Iridescence (now cleaned)
H. 14.5 cm; Diam.: of base 7.5 cm, of body 10.2 cm, of rim 9.1 cm
10th century
1938; Tepe Madraseh, drain in H4, lower level
MMA 39.40.101

Broken, mended, a number of pieces missing; now completely restored. Globular body on ring base, with kick in center and pontil mark. Flaring neck. Applied handle reaching from body to rim of neck; at top, additional glob of glass pinched flat to serve as thumb-rest. On the body, a single horizontal groove below and two grooves above framing a frieze containing three roundels. In each roundel an animal facing left: in the side roundels birds, in the center opposite the handle a crosshatched lion with upturned tail, in profile, running toward the left. In the spandrels, geometrical motifs. The frieze interrupted where it meets the handle; lines imitating scrollwork engraved around the handle. Around the neck, above a double groove, crescent-shaped and V-shaped cuts joined to form continuous horizontal decorative patterns. The handle marked with diagonal cuts.

Reference: Hauser and Wilkinson, "Museum's Excavations," p. 106, fig. 35.

This is the only vessel found during the excavations with a decorative pattern of roundels around its body. The roundels, not integrated into a continuous scrollwork but surrounded by vegetal and geometrical forms, contain animals facing left. This type of design is known from Sasanian and Islamic metalwork (Orbeli and Trever, *Sasanidskii metall*, pl. 29; Atıl, *Islamic Metalwork*, no. 10; Baer, *Metalwork*, fig. 230) and from relief-cut glass vessels. The decoration is thus part of a continuous tradition. One of the relief-cut glass bowls was found in Fusṭāṭ and is datable to no later than the ninth century. It has a series of roundels, each containing a bird passant to the left (Pinder-Wilson and Scanlon, "Glass... Fustat: 1964–1971," no. 20). Another example is the Buckley bowl, which shows a bird in the center and other animals in the surrounding roundels (Charleston, "Group of... Glasses," p. 215, pl. 2 A–C; Pope, *Survey*, pl. 1440c). Birds facing left are set into square panels on a glass relief-cut bottle (Hasson, *Early Islamic Glass*, ill. 24). The long-tailed birds on this jug from Nishapur, possibly pheasants or peacocks, recall the similar stylized birds on Sasanian seals, and the





quadruped walking to the left, possibly a lion, may also have Sasanian ancestors (Bivar, *Catalogue of... Seals*, pls. 21, 9; Brunner, *Sasanian Stamp Seals*, p. 108, no. 172, p. 109, no. 29, p. 96, no. 183). An animal of the same type is found on the Benaki bottle in Athens (Fig. 14, p. 162). The use of cross-hatching as a characteristic decoration for animals is well known from Roman glass found in Dura-Europos (Clairmont, *Glass Vessels... Dura-Europos*, nos. 304, 305, pl. 29). Animals represented on glass vessels usually face left unless they are affronted or addorsed, as with a central tree.

The continuous patterns of crescents and V-shaped cuts on the neck of the jug are also found on a differently shaped ewer with slant-cut abstract decoration (Leth, *Davids Samling*, p. 139, no. 19; Folsach, *Islamic Art*, no. 225). The diaper (cross-hatching) design with horizontal cuts is a feature that also occurs on the Benaki bottle.

This type of vessel and its decoration are stylistically related to such outstanding works of art in precious metals as the well-known Buyid gold jug in the Freer Gallery of Art in Washington, datable to the tenth century (Lowry, "On the Gold Jug").



Inkwells

Three inkwells were found at Nishapur, each probably representing a different type. Numbers 229 and 231 are from Tepe Madraseh and Sabz Pushan, respectively; the findspot of Number 230, a fragment, is unknown.

Number 229 is nearly complete. It belongs to a type of inkwell that has a squarish body and tiny handles at the four corners. The inkwell was made either by blowing the glass into a mold or by tooling it to a cubic shape and rounding the shoulder. Into the jar a cylindrical tube was fitted which opened to a flat rim. A principal feature of glass inkwells, this type of fitting had previously been employed in Roman ceramic inkwells known from Jordan (Khairy, "Ink-wells"). The tube that descends into the vessel was necessary to prevent the ink from splashing and was also used in inkwells made of other materials, such as metal. Only vessels with this device can safely be described as inkwells. The tiny handles may be derived from those on Roman glass inkwells. (See Saldern, *Glassammlung Hentrich*, no. 240, a Roman inkwell of the first or second century A.D. with three dolphin-shaped handles that are more pronounced than handles on the Islamic inkwells. For this type of Roman inkwell compare Isings, *Roman Glass*, no. 77.) It is not known whether these little handles were merely decorative or actually functional, with the inkwell suspended from cords that ran through the handles and were held by the scribe, as is thought to have been the practice with metal inkwells (Baer, *Metalwork*, pp. 66ff.). Square inkwells are not known in large numbers and were not recommended by Muslim scribes, as the corners could not be properly cleaned and therefore the ink would spoil. (See Qaddumi, *Variety*, p. 109; Baer, "Islamic Inkwell," p. 199; Baer, *Metalwork*, pp. 66–68.) However, in the treatise on bookbinding by Ibn Bādīs, the round shape mentioned refers especially to the mouth of the inkwell, where a piece of wool or felt soaked with ink was placed (Levey, *Medieval Arabic Bookmaking*, p. 15). It seems likely that the inkwells described by Ibn Bādīs were different in type from the glass inkwells described here.

The fragment Number 230 may have belonged to a cylindrical vessel with four tiny handles, a type also found in Susa. Inkwells of hexagonal and octagonal shape, usually with handles, are also known; they are said to have come from Iran (for the literature see Number 230). It is also possible that Number 230 is from a vessel originally identical to Number 231.

Number 231, which represents a third type, is unfortunately no longer extant. It may have been simply a globular glass vessel with the tubular inset. Some sort of thick handle may have been attached to the upper right side, but it is not really possible to say. The glass vessel was covered with a coat of plaster without decoration. Since this interesting piece is lost, it is impossible to analyze the remains, which would have given information on the ink used. For unknown reasons the excavators called this object a lamp, but the tubular inset makes it more probable that the vessel was an inkwell. Numerous inkwells enclosed in plaster are known, but the plaster holder is always square and decorated and the glass container is usually of a different type: short-necked or wide-necked, or a jar. To my knowledge, none has a tubular inset.

Most of the glass inkwells now known and cited in the discussions that follow are from Iran and are usually dated to the ninth or tenth century. Whether the types they represent were common all over the Islamic world is a question that cannot be answered yet. It seems that inkwells made of glass were widely used in the Islamic world when Ibn Bādīs wrote, about 1025 (Levey, *Medieval Arabic Bookmaking*, p. 5). Others were of metal (Allan, *Nishapur: Metalwork of . . . Islamic Period*, pp. 44–45, nos. 104–5; Baer, *Metalwork*, pp. 66ff.), ceramic (probably), and other materials. From the excavations and analyzed remains in Samarra, we know that simple glass bottles were used as inkwells (Lamm, *Glas von Samarra*, no. 74, fig. 19, pl. 2). Indeed, small bottles such as Numbers 60–86 could well have served the same purpose in Nishapur. From the treatise of Ibn Bādīs we know that glass vessels of many different shapes were used as inkwells (Levey, op. cit., pp. 1ff.). Thus many vessels were manufactured to serve a variety of needs—both those of simple type, like the small

bottles from Samarra, and others of finer glass and workmanship. The difference between the examples from Tepe Madraseh and those from Sabz Pushan may well reflect differences in the social status of the owner.

229. Inkwell

Colorless, greenish tinge
H. 4 cm; Diam. 4.4 cm
9th–10th century
1939; Tepe Madraseh, well in Y2
Tehran, Iran Bastan Museum 20381



Broken, mended; parts of wall and handle missing. Squarish body, flat base, flaring sides and rounded shoulder. A vertical tube inside the vessel opening to a flat rim. Four small handles (one missing) attached to the upper corners of the vessel.

For a square inkwell which is slightly larger but lacks the inset tube, said to be from Iran, see Kröger, *Glas*, no. 90.

---

230. Fragment of an inkwell

Yellowish green. Patchy corrosion
H. 3.8 cm; L. 7.2 cm; Th. 0.2 cm
9th–10th century
1939(?); exact provenance unknown
MMA 48.101.275





230

Fragment of upper section around mouth of vessel. A vertical tube broadening to a flat circular rim 6.2 centimeters in diameter. The rim was flattened on a sandy ground. Below the rim, fragments of a second layer of the vessel. Two tiny handles attached to both the rim and the layer below.

For similar fragments, see Lamm, *Glass from Iran*, p. 10, pl. 14F–G (where they are erroneously interpreted as candlesticks). An unpublished yellowish glass fragment from the excavations in Iṣṭakhr, Iran, is in the Oriental Institute in Chicago (inv. no. I 2-1434 v).

For intact round inkwells usually given a ninth-to-tenth-century date, see Lamm, "Verres . . . à Suse," p. 363, pl. 80:3; Hasson, *Early Islamic Glass*, ill. 10; *3000 [Dreitausend] Jahre*, no. 575; Qaddumi, *Variety*, p. 108 (LNS 89G). For an example with just one handle, see Lamm, *Glass from Iran*, pl. 14K. An inkwell with three handles and applied decoration but no tubular inset is illustrated in Lamm, *Mittelalterliche Gläser*, p. 81, pl. 22:12, and Pope, *Survey*, pl. 1439G. See also the inkwell of opaque turquoise glass with concave sides in Auth, *Ancient Glass*, no. 244.

For hexagonal or octagonal inkwells, see Saldern, *Glassammlung Hentrich*, no. 397; *Arts of Islam*, London, nos. 117–18; Qaddumi, *Variety*, p. 109 (LNS 80 G).

231. Inkwell

Color unknown
H. unknown; Diam. 9.6 cm
9th–10th century
1939; Sabz Pushan, 11F
Discarded



Broken, mended. A number of pieces missing. A glass vessel, probably of a globular shape, enclosed in a spherical plaster coating. A vertical tube from inside the vessel opening to a flat rim, as on Numbers 229 and 230. On the side of the vessel, probably the remains of a crudely affixed handle (at right in photograph).

Numerous examples of a vessel enclosed in a square, decorated plaster holder have been published, but little is known about the glass containers inside the holders. See *Excavations at Samarra*, pl. 144; *Glass . . . Smith Collection*, no. 457; "Recent Important Acquisitions," 1962, p. 143, no. 19; Scanlon, "Fusṭāṭ... Report 1965," Part II, p. 74, fig. 5a; Whitehouse, "Excavations," 1970, pl. 11d (called a lamp or incense holder); Genito, *Vetri iranici*, pp. 26, 27; Raeuber, *Islamische Schönschrift*, fig. 69; Sugiyama, *Ancient Glass*, nos. 184–85; Kröger, *Glas*, no. 18. Ninth-to-tenth-century inkwells from Samarkand are said to have had between one and four glass vessels; see Stavisky, "Samarkandskiye chernil'niye." See also *Terres secrètes*, p. 118, no. 315 (plaster holder with two glasses).

Lamps

The inhabitants of Nishapur had at their disposal lamps of a variety of types and could choose among lamps made of metal, ceramic, or glass. While there is a relationship between some of the metal and ceramic types (Allan, *Nishapur: Metalwork of... Islamic Period*, pp. 45–49, nos. 106–10), the glass lamps catalogued here have little in common with excavated examples in other materials, with the exception of the mosque lamp type (No. 235).

Only five glass vessels or vessel fragments were found that can with some certainty be identified as lamps. They are from Tepe Madraseh and the Village Tepe and are of colorless glass with a yellowish green tinge. They represent lamps of four different types. Numbers 232 and 233, both from the same findspot in Tepe Madraseh and probably stemming from one glasshouse, are of the same type. Number 232 was found nearly complete, leaving no doubt about its original use. It is a cylindrical beaker of a familiar type, slightly higher than wide, with an upright cylindrical tube inside—the wickholder—and an angular applied handle with a thumb-rest. This is a simple, versatile, portable lamp, probably inexpensive, and it is surprising that only one similar object is known. That piece is from Samarra, so the type was certainly already in use in the ninth century and very likely continued into the tenth century. It is difficult to know how long such a simple vessel type existed and when, or from where, it would have been introduced to the inhabitants of Nishapur.

All the other lamps are handled bowls of various types. Number 234, of which only a part of the wall and a handle remain, is from a vessel with a cylindrical or flaring body and a cylindrical neck. The applied handle with looped thread suggests that the lamp was of a type decorated with many looped handles and known from numerous examples. It could have been either a standing or a hanging lamp.

Only fragments remain of Number 235, and its exact findspot is unknown. It is of a type often called a mosque lamp, although such lamps were not necessarily used in mosques. This small lamp has a globular body and a short, flaring neck; it could have stood on a footring or hung from iron chains connected to its loop handles, which were attached with prunts (applied medallions). Remains from the center of the inside show that there was a wick-holder. Many small mosque lamps of this type, said to be from Iran, are known. Most are very similar to this example, with only minor variations in the height and the color of the prunts. Pottery lamps of the same type were also used in Nishapur. No example of the type can be dated with certainty. The most definite dating is provided by a painting of a lamp (very likely of metal) on the wall of a Seljuq tomb tower that dates to A.H. 460/A.D. 1067–68 (Fig. 18). A lamp of the same type from the Serçe Limanı ship is datable to the first half of the eleventh century. Thus it is reasonable to assume that these lamps were made in the second half of the tenth century and the eleventh century, and possibly into the twelfth century. It is very likely that in addition to these small lamps a

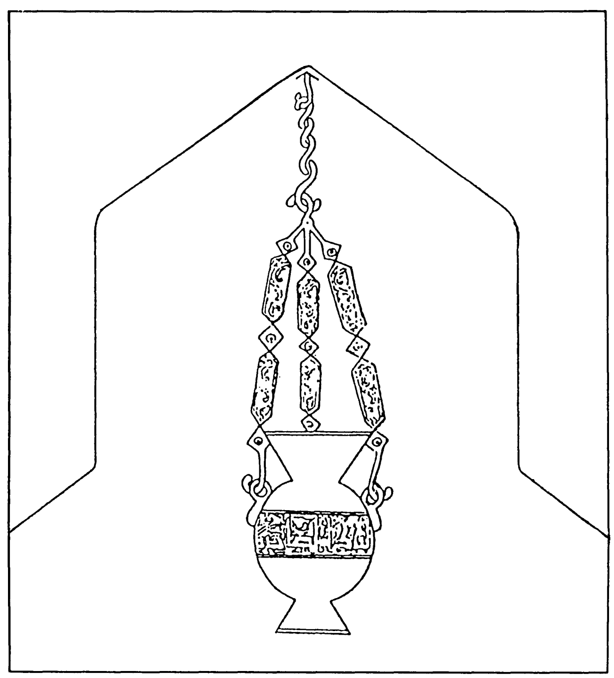


Figure 18. Drawing of a painted mosque lamp in the Seljuq tomb tower no. I. Kharraqan, Iran, A.D. 1067–68. From Stronach and Cuyler Young, "Three . . . Towers," p. 10

larger type existed, suitable for actual use in mosques. This may have also been the purpose of large metal lamps of the same type datable to about the tenth century (see *Art from the World of Islam*, Humlebaek, no. 27, and Allan, *Nishapur: Metalwork of . . . Islamic Period*, p. 47, E).

Number 236 clearly was part of a larger lamp with a globular body and conical neck and thus represents a fourth type. Nothing can be determined about the lower part of the lamp. The handle is of the type with applied looped thread; it has an additional thumb-rest, the purpose of which is not known. This type is also known from Samarra. Perhaps a variant of it is an Umayyad lamp type with a short, flaring neck, a globular body, and handles attached to the body at the point of widest diameter (von Bothmer, "Architekturbilder," fig. 7), known in examples from Nessana and Samarra (Harden, "Glass," *Excavations at Nessana*, pl. 28, no. 56; Lamm, *Glas von Samarra*, p. 36, fig. 25; *Excavations at Samarra*, pl. 106).

Since not many types of glass lamps are known from the early Islamic period in Iran and Iraq, it may well be that the examples found in the excavations represent the most important types. One kind not present at Nishapur is the bowl-type lamp with a stem or tapering bottom but without a base, which was intended for suspension in a metal ring. This type of lamp was found in Samarra and Sīrāf (Lamm, *Glas von Samarra*, no. 145, pl. 4; Whitehouse, "Excavations," 1970, p. 18, pl. 12b) and is known from Egypt (Lamm, *Mittelalterliche Gläser*, pl. 12:12; Crowfoot and Harden, "Early Byzantine . . . Lamps"). On the other hand, it is true that any type of beaker, even one without a wick-holder, could have been used as a lamp if a separate wick-holder, perhaps of a different material, was placed in the vessel.

232. Lamp

Colorless with yellowish green tinge
H. 6.9 cm; Diam. 10 cm
9th–10th century
1939; Tepe Madraseh, S11
Tehran, Iran Bastan Museum 3944

Broken, mended; almost complete. Beaker with flat base and cylindrical body similar to Numbers 44–53. A thick vertical tube applied to the inside bottom serving as wick-holder. A handle with thumb-rest on the exterior.

Reference: Wilkinson, *Nishapur: Pottery*, p. 264, no. 4.

Compare Lamm, *Glas von Samarra*, pp. 34–35, 38, no. 149, fig. 27 (an identical lamp from house 9; H. 8 cm, diam. 9 cm). This type was probably common in Samarra, as another example was found there in a fragmentary state (*Excavations at Samarra*, pl. 118:11). A lamp identical to the Nishapur find is in the Corning Museum of Glass (inv. no. 76.1.21, H. 9.7 cm, said to be from Nishapur). From Dwin comes a lamp with a wick-holder but without the handle; see Janpoladian, *Medieval Glassware*, pl. 5:12. A handled vessel without a wick-holder is in Berlin (Kröger, *Glas*,



no. 109); whether this type should be described as a lamp is an open question. (However, it now seems more and more probable that cylindrical vessels with applied curled thread decoration were lamps.) For a full discussion of the type see also Crowfoot and Harden, "Early Byzantine ... Lamps," p. 206, pl. 30 (no. 52).

---

233. Lamp

Colorless. Corrosion and iridescence
H. 6.7 cm; Diam. 8.4 cm
9th–10th century
1939; Tepe Madraseh, S11
MMA 40.170.175

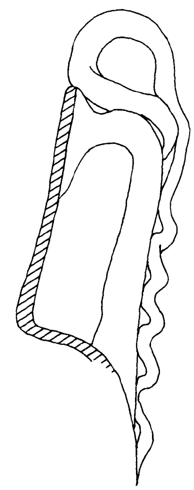


Sections of wall and parts of base, with wick-holder, missing. Now completely restored, following Number 232. Flat base with pontil mark. Thick handle applied to exterior wall.

In making the handle a thick gob of glass was applied low down on the vessel wall, then pulled upward and applied to the upper part of the wall. The remainder, by now a very thin thread, was pulled backward and down over the handle. Finally, the broad thumb-rest was pinched. This method of fashioning a handle was typical for the Sasanian period (as shown by Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 110ff., 718ff.).

234. Handle

Colorless with yellowish green tinge
H. 7.5 cm; W. 2.5 cm
9th–11th century
1939; Village Tepe
Discarded



Handle with part of wall of vessel. From a vessel with globular body and cylindrical or flaring neck. Handle applied from body to rim. Thread applied to handle creating large circular loop at top and descending in a series of S-curves.

See Hasson, *Early Islamic Glass*, ill. 8 (Iran, eighth–tenth century; H. 16.5 cm) for an intact example. Another small lamp in Zurich (Billeter, *Glas*, pp. 46–47) has a flaring body, cylindrical neck, handles of the same kind, and a wick-holder inside. It is of colorless glass and is said to be from Nishapur (H. 8 cm, diam. 8.5 cm). Two other examples with a wick-holder have been published in Kordmahini, *Glass*, pp. 74, 88, colorpl. on p. 22, where they are called mosque lamps. A beaker with numerous handles, excavated in Rayy, may also have been used as a lamp; see E. F. Schmidt, "Persian Expedition," pl. 6, and Lacam, "Contribution," p. 27, fig. 6. A small fragment excavated in Susa and dated to the first half of the eighth century may have belonged to a somewhat different kind of lamp that also features applied threads (Hardy-Guilbert, "Niveaux islamiques," pp. 194–95, fig. 31:2).

235. Lamp

Colorless with yellowish green tinge
H. 12.2 cm; Diam. at rim 11.8 cm
10th–11th century
1939; exact provenance unknown
MMA 48.101.59

Broken, mended. Missing pieces of wall and rim restored. Rounded footring, kick-base with pontil mark. Globular body with flaring rim. Around the body were six prunts with loop handles, of which two survive. Inside the base, remains of the vertical tube applied for holding a wick.

Compare Lukens, "Medieval Islamic Glass," p. 201, figs. 4–6, a small lamp of this type in The Metropolitan Museum of Art, discussed in connection with the ceramic lamp from the Nishapur excavations; and Jenkins, "Islamic Glass," no. 40 and p. 8, for the fragmentary example from the Serçe Limanı wreck. This type of vessel is often called a mosque lamp. Numerous related examples are now known, mainly

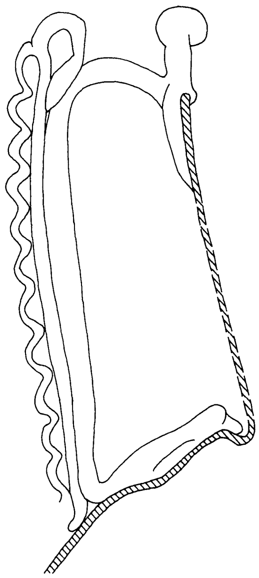




Restored

from Iran; see Saldern, *Glas . . . Sammlung Hans Cohn*, no. 176; Kröger, *Glas*, no. 135; Harden et al., *Masterpieces*, no. 149 (example with additional looped decoration and applied prunts); Lamm, *Glass from Iran*, pl. 141, for a lamp without a footring or high splayed foot. Prunts, probably from lamps of this type, were found in Ctesiphon; see Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 964ff. A superb example with unknown place of origin is shown in Fremersdorf, *Antikes . . . Glas*, no. 885, p. 97, pl. 61. For a discussion of this type in the context of other lamps, see Crowfoot and Harden, "Early Byzantine . . . Lamps," p. 205, pls. 30, 46–47.

For a different type of small lamp that could be suspended or used standing and that also had an internal wick-holder, see Auth, *Ancient Glass*, no. 243.



---

236. Handle

Yellowish green
H. 12 cm; W. 5.2 cm
9th–11th century
1939; Village Tepe
MMA 48.101.272

Handle with remains of wall of vessel at the attachment. Knobbed finial or thumb-rest at top. Applied thread reaching from body to top of handle, where it forms a loop. Narrow thread descending over the handle in curls as on Number 234.

For another example, similar except for the thumb-rest, see *Excavations at Samarra*, pl. 120, top center. For a thumb-rest of this kind see Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, no. 737.



236

Windows and Lanterns

Fragments of decorated stucco window frames were found in the secular buildings in Tepe Madraseh, Sabz Pushan, Qanāt Tepe, the Vineyard Tepe, and Village Tepe (Wilkinson, *Nishapur: . . . Buildings*, pp. 146–56). It can be assumed that circular panes were set into these plaster frames. Wilkinson wrote, "Some of the rooms at Nishapur had been enhanced by windows that filtered the daylight through colored glass set in plaster frames" (ibid., pp. 151–52), but these colored glass fragments seem to have been discarded, and it appears that no notation was made on the colors. One section of a window frame, Number 237, is the only fragment that was photographed and drawn. Wilkinson described it: "Although only a few fragments of these windows survived, and none was found in situ, they nonetheless add to our knowledge of the lives of the people who inhabited these buildings. From X5 in the secular part of Tepe Madraseh . . . came the only fragment with a sizeable piece of glass still intact in its double plaster setting [No. 237]. On one side the small glass inset is in the shape of an inverted teardrop, on the other, a trefoil, and there are grooves for larger insets along the edges of the fragment. The glass itself has a greenish tinge and was made with a thickened rim such as is seen on large platters of blown glass like [No. 14 in this catalogue]. These windows were evidently meant only to let light in, and not to allow those within to observe the world outside" (ibid., p. 151). Wilkinson had written earlier that the glass of windows is always undecorated ("Life in the . . . City of Nishapur," 1949, p. 74).

Quite possibly, circular windowpanes were set into this window frame and the lantern Number 238; round windowpanes are known to have existed in Iran. In the Sasanian period, panes of light green glass 24 centimeters in diameter were used at Takht-i Sulaimān (unpublished fragments in Berlin, Museum für Islamische Kunst). They do not have the thickened rim that frequently characterizes panes of the Islamic period. In Samarra, circular panes as well as other types of window glass were set into plaster frames, but detailed information on the frames is lacking (Lamm, *Glas von Samarra*, pp. 127–28, fig. 72). Similar panes were also used in the Ctesiphon region (Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 207–9, 975, diam. 16 cm) and in Iran (Lamm, *Glass from Iran*, pl. 14N, diam. 18–20 cm; *Glass . . . Smith Collection*, no. 464, diam. 14.9 cm). Fragments of painted glass, probably from windowpanes, are known from the eighth-century site of Khirbat al-Mafjar in Jordan and from other sites but are not mentioned by their excavators (Brosh, "Glass Window Fragments").

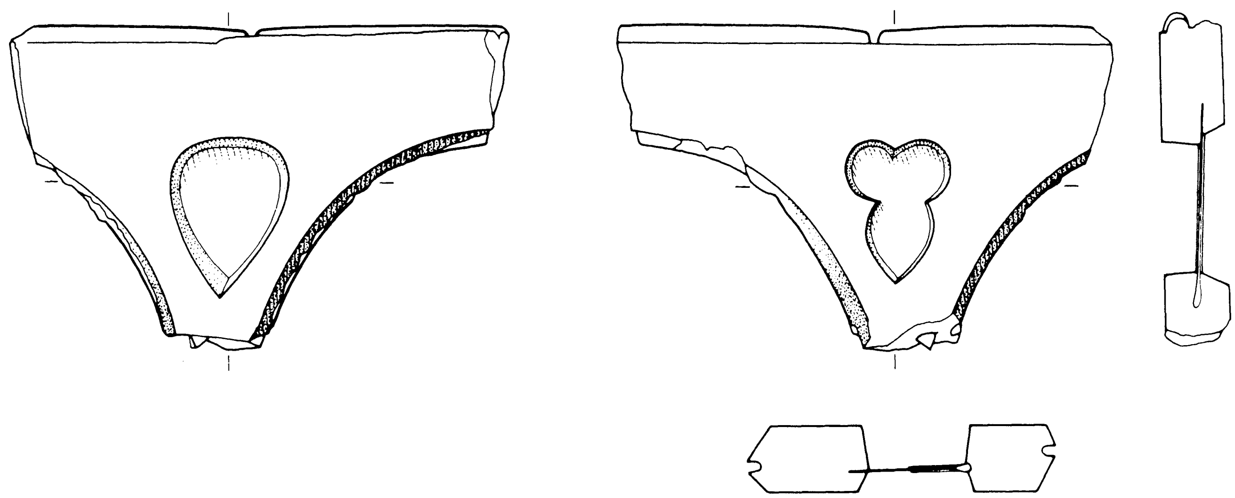
While the use of windowpanes is widely attested, the plaster lantern from room V14 in the Vineyard Tepe (No. 238) is very unusual. An oil lamp could be set into such a lantern. Apparently the three circular openings were closed with glass panes, but not the square one. The color of the glass is not known; only a trace of the glass remained when the lantern was unearthed (Upton, "In the Ruins," p. 449).

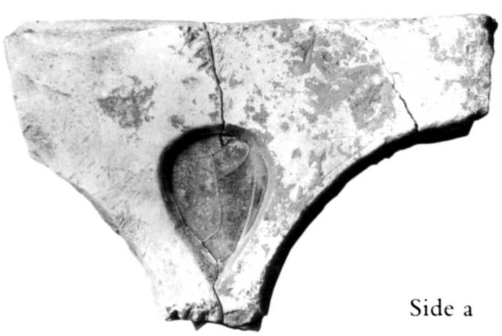
237. Fragment of a window

Plaster and colorless glass with greenish tinge
H. 12 cm; L. 21 cm
10th century
1939; Tepe Madraseh, X5
Tehran, Iran Bastan Museum

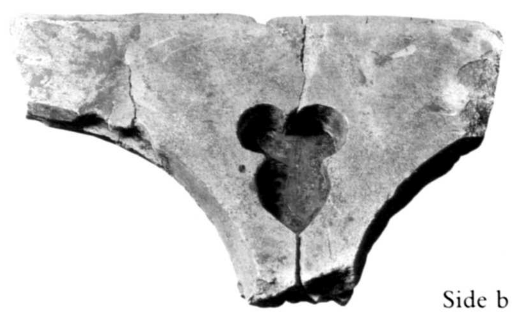
Fragment of a window frame, a double-sided plaster setting with cracked remains of glass insets. Parts of large rounded openings below, probably for circular glass panes. In the spandrel, opening for a glass inset; opening in shape of an inverted teardrop on one side, trefoil shape on the other side. Glass inset had a thickened rim.

Reference: Wilkinson, *Nishapur: . . . Buildings*, pp. 150–51, fig. 1.174.





Side a



Side b

237

238. Lantern

Plaster and glass
H. 20–22 cm (14.5 cm in Wilkinson, *Nishapur: . . . Buildings*)
10th century
1937; Vineyard Tepe, V14
Tehran, Iran Bastan Museum



Lantern in form of a cube, originally with round glass panes—now gone except for tiny fragments remaining—on three sides and a square aperture on the fourth. A large circular opening in the center of the top (diam. 4.5 cm) and four small round openings surrounding it (diam. 2 cm). The base shows no soot.

References: Upton, "In the Ruins," p. 449, fig. 5; Wilkinson, *Nishapur: . . . Buildings*, p. 151, fig. 1.173.

Glass for Medical or Chemical Use

Vessels with a cylindrical, globular, ovoid, or pear-shaped body and a long spout are found in nearly every excavation site of the Islamic period, usually in considerable numbers. The spout may have a slight bend or a deep one. They appear only in glass. The quality of the glass and of the manufacture shows that these were purely utilitarian vessels. Since the types have hardly changed over the centuries, precise dating is not possible.

Despite the widespread occurrence of these vessels, very little is known about their actual use. It was once thought that these vessels were used as cupping glasses for hygienic or medical procedures, but now it is believed likelier that they were used as alembics, probably in connection with a distillation apparatus, in chemistry or alchemy experiments. It is also possible that they were used in homes to produce rose water or date wine (see al-Hassan and Hill, *Islamic Technology*, pp. 134–35).

So far, no excavation has yielded a complete set, which probably consisted of three vessels, the cucurbit (*qarʿa*), the alembic (*anbīq*), and the recipient (*qābila*). A set in the Science Museum in London (Anderson, "Early Islamic Chemical Glass") consists of four vessels: an alembic with a narrow, fairly straight spout (H. 10.6 cm), a cucurbit (H. 31 cm; see al-Hassan and Hill, op. cit., fig. 6.2), a dome-shaped narrow-collared vessel (H. 11 cm; diam. of base 7.5 cm), and a dome-shaped wide-collared vessel (H. 12.6 cm). Although the cucurbit and the wide-collared vessel fit into one another, as do the alembic and the narrow-collared vessel, this may be simply coincidence; whether this set is complete is not known, nor is its exact provenance.

Two somewhat different vessel shapes have been put in the category of "alembic." On some vessels, including the one in the Science Museum, the cup has a constricted neck, short and cylindrical, and the spout is fairly straight or points slightly downward (see also Lamm, *Glass from Iran*, pl. 15 I; al-Hassan and Hill, *Islamic Technology*, p. 135, fig. 6.3). The open-shape vessel, usually with a curved spout like the Nishapur finds, is more common. An example of this type was also excavated in Gurgān, from a place thought to be a bathhouse (Kiani, *Islamic City*, fig. 52, pl. 49:2). The interpretation of these vessels as being for medical use is based on a miniature in a manuscript of the *Maqāmāt* (The Assemblies) of Harīrī, painted in Baghdad between 1225 and 1235, which shows doctor and patient in the process of bloodletting (Hasson, *Early Islamic Glass*, p. 5, ills. 1, 2). However, whether the vessel used has a spout cannot be seen. We will probably know the exact use of these objects only after future excavations with more precise find circumstances provide clues about the specific functions of the differently shaped vessels. The Nishapur finds indicate that the vessels may have been a common household necessity. Perhaps, as has been suggested for identical Roman vessels of this type (Saldern, *Glassammlung Hentrich*, no. 236; Isings, *Roman Glass*, no. 76), they were used as a kind of siphon, for date wine or for some other beverage, such as the sherbets that were drunk in Nishapur (Wilkinson, "Water," pp. 182–83).

The five examples presented here are from Sabz Pushan (Nos. 239, 240, 243), Tepe Madraseh (No. 242), and a mound near the Mashhad Road (No. 241). Their findspots give no clues about their original use. They are of greenish (Nos. 239, 241), green (No. 240), or bluish green (No. 242) glass, much the same as that of utilitarian bowls and dishes (for No. 243 the color is not known). The workmanship is somewhat careless, with thick walls and sometimes a very crude pontil mark (No. 240).

Numbers 239 and 240, both found in a well in room 9D in Sabz Pushan, could well have been made by the same hand. The cup is cylindrical and the spout only slightly bent. The other three examples are more globular in shape, and Number 241 has a thickened rim. All the cups have a height of between 5 and 6 centimeters. On all of them the spout is attached close to the rim, not in the middle of the cup as is sometimes the case (Lamm, *Mittelalterliche Gläser*, p. 33, pls. 2, 14). The deeply bent spout of Number 242 is an unusual feature that must be connected with its use.

239. Alembic

Greenish
H. 6 cm; L. 14.2 cm; Diam. of cup 4.8 cm
9th–11th century
1937; Sabz Pushan, well in 9D
Tehran, Iran Bastan Museum 20530



Broken, mended; section of wall missing. Worked from thick glass. Cylindrical body with long attached spout, which is only slightly bent.

For other examples from Iran see Lamm, *Mittelalterliche Gläser*, p. 33, pl. 2:14; idem, "Verres . . . à Suse," p. 363, pl. 75:5; idem, *Glass from Iran*, pl. 15 B, C; Whitcomb, *Before the Roses*, p. 155, fig. 59a. For an example said to come from Nishapur and a short discussion of use, see Hasson, *Early Islamic Glass*, p. 5, ills. 1, 2. See also Wulff, *Traditional Crafts*, fig. 243, and Nasr, *Islamic Science*, pl. 113.

For examples outside Iran see Kröger, *Parthisches . . . Glasfunde von Ktesiphon*, nos. 971–74; Lane, "Medieval Finds," p. 66, fig. 10 T (found in great numbers all over the site of al-Mīnā). For finds from Fusṭāṭ see Kubiak and Scanlon, "Fusṭāṭ . . . Report, 1971," p. 82, fig. 9a (A.D. 750–850).

240. Alembic

Green. Corrosion and iridescence (now cleaned)
H. 5.5 cm; L. 14 cm; Diam. of cup 4 cm
9th–11th century
1937; Sabz Pushan, well in 9D
MMA 38.40.195

Broken, mended. Spout restored. Cylindrical body with crude pontil mark on the base. Thick, flaring rim. Spout only slightly bent.

240



241. Alembic

Greenish
H. 6 cm; L. 12.5 cm
9th–11th century
1939; mound on Mashhad Road
Tehran, Iran Bastan Museum 8246

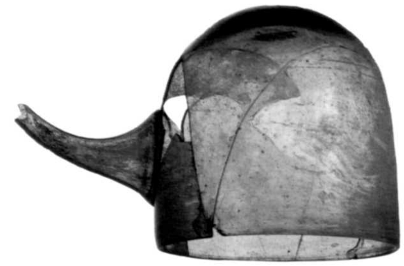


Broken, mended; two sections of wall missing. Now restored. Oval body with thickened rim. Spout has considerable curve.

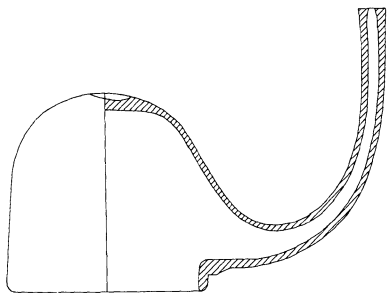
242. Alembic

Green with bluish tinge. Heavily corroded; iridescent
H. 5 cm; L. 9.9 cm; Diam. of cup 5.3 cm; Th. at rim 0.2–0.3 cm; Diam. of spout 0.6 cm
9th–11th century
1939; Tepe Madraseh, To
MMA 40.170.132

Broken, mended; several sections of wall missing, now restored. End of tube missing. Cylindrical body with round, thick base and deep pontil mark. Spout deeply curved.



243





242

---

243. Alembic

Glass color unknown
H. 6.7 cm; L. 11 cm; Diam. of cup 6.7 cm
9th–11th century
1935–36; Sabz Pushan, well in B
Discarded

Broken, mended. Sections of wall and tube missing. Cylindrical body.

Jewelry

Of the jewelry excavated at Nishapur, only a few pieces are of or incorporate glass. They are a pendant (No. 244), two finger rings (Nos. 245, 246), and a number of beads (Nos. 247–297). One would have expected glass bracelets as well, but apparently none were found.

Unfortunately, for most of these small finds the exact findspot is not known. The majority of them were inventoried in The Metropolitan Museum of Art after the excavations had come to an end and thus do not appear in the excavators' find books.

Small finds of this kind were often used over an extended period of time or reused, and sometimes modern pieces are mixed in with the excavated material. Small finds are thus especially difficult to date. This is particularly true for beads.

Glass has always been the cheapest material for insets in jewelry and for beads. Nevertheless, certain types of glass jewelry were apparently much enjoyed and were widely used in Islamic society, perhaps especially because of the wide range of colors achievable in glass. Glass jewelry may also have been made, on occasion, to deceive the viewer. Beads of glazed rock crystal, also excavated at Nishapur (not included in this catalogue), were probably intended to simulate a more precious stone. "Further evidence that such imitation was practised are the numerous passages in the literature of early Islamic mineralogy indicating that pearls and precious stones were intentionally faked during this [early Islamic] period. It seems highly likely that a large percentage of early glass colors were made in imitation of natural stones. Literary evidence also suggests that the early Chinese were duped by the Syrians, who sold them glass as precious stones" (Hobson, "On Chinese Cloisonné," p. 138, quoted in Jenkins and Keene, *Islamic Jewelry*, p. 28).

The subject of early Islamic jewelry, which is known about both from the excavated objects and from stucco reliefs and wall paintings, is treated in Jenkins and Keene, *Islamic Jewelry*, pp. 15–36, and in Hasson, *Early Islamic Jewellery*.

RINGS AND A PENDANT

244. Pendant

Lead with blue glass
H. 3.8 cm; Diam. 3.2 cm; Th. 0.2 cm
9th–11th century
1939; Tepe Madraseh, room X2
MMA 40.170.260





Round disklike pendant of cast lead with two suspension eyes at top. Around the outer part a dot-and-circle motif between two borders. In the center a flat blue glass inset of irregular outline.

Reference: Allan, *Nishapur: Metalwork of . . . Islamic Period*, no. 192, pp. 55, 106–7.

This is the only pendant excavated at Nishapur. The irregularity of the glass inset suggests that the glass may have been a replacement for a lost, perhaps more precious, stone. This is one of the few pieces of jewelry with a recorded findspot. Also from room X2 at Tepe Madraseh are the vessels Numbers 96 and 182, which were found in the well of that room. The pendant cannot be properly dated because no significant parallels exist.

245. Finger ring

Silver with white glass
Diam. 1.8 cm
9th–11th century
Excavation date unknown; Sabz Pushan
Tehran, Iran Bastan Museum



Narrow silver ring with rounded rectangular flaring bezel. Oblong inset of white glass, inscribed (inscription has not been read).

Reference: Allan, *Nishapur: Metalwork of . . . Islamic Period*, no. 53, pp. 31–32, 68–69.

Only two finger rings with glass insets were excavated at Nishapur. Since the exact findspots are not known, they cannot be dated on the basis of stratigraphy; nor can they be dated precisely on comparative grounds.

A number of finger rings without glass insets were found during the excavations. Some of them were first published in Jenkins and Keene, *Islamic Jewelry*, pp. 16–17, no. 1a–f. The entire range of metal rings from the excavations was catalogued in Allan, *Nishapur: Metalwork of . . . Islamic Period*, nos. 45–59. No rings made of glass were found.

Finger rings with glass insets and glass rings from uncontrolled excavations in Iran have been published in Fukai, *Persian Glass*, pls. 53, 54, where they are given first-to-third-century dates and are said to come from Gīlān Province, bordering the Caspian Sea.

---

246. Finger ring

Bronze with red glass
Diam. 1.8 cm
9th–11th century
Excavation date unknown; Qanāt Tepe
Tehran, Iran Bastan Museum

Bronze ring with round bezel. Inset of red glass.

Reference: Allan, *Nishapur: Metalwork of . . . Islamic Period*, no. 56, pp. 31–32, 68–69.



246

BEADS

The bead specialist Peter Francis Jr. examined the Nishapur bead finds in The Metropolitan Museum of Art in September 1987 and identified a number of the beads as modern.[1] Forty-six glass beads are of the Islamic period; these are catalogued here. The classification system developed by Horace Beck ("Classification," pp. 1 ff.) has been used when possible, although not followed strictly. The beads are grouped according to shape or other prominent feature.

Spherical and near-spherical beads, as usual, are the most numerous (Nos. 247–259). Other shapes include flat-sided (Nos. 260–263), cylindrical (Nos. 264–266), and faceted (Nos. 267–271). There is one square bead (No. 272) and some beads of other shapes that occur only once, the most remarkable being the bead cut into a fish shape (No. 276). All the beads have a single perforation.

There are in addition some multicolor beads, but most are of a single color, either transparent or opaque. (A bead is transparent unless described in the entry as opaque.) There are no painted or gilded beads. Because of corrosion

1. The MMA accession numbers of the modern beads are: 40.17.700b–f; 48.101.75d; 48.101.85a–c; 48.101.90c (see Jenkins and Keene, *Islamic Jewelry*, no. 11); 48.101.90e, l–o (ibid.); 48.101.90w; 48.101.192c, d; 48.101.209b(?), c, d.

some of the color identifications may be incorrect, and the colors of several beads could not be determined. The beads of transparent glass are of the following colors: green (Nos. 252, 266), dark (emerald) green (Nos. 267, 269–271), blue (Nos. 258, 273), dark blue (Nos. 248, 261), yellowish (No. 247), and colorless (Nos. 256, 259, 275). Unlike all the other beads are Numbers 255 and 265, which were made by applying transparent glass of one color over a core of opaque glass of another color. For Number 255 a yellow layer is superimposed on opaque turquoise glass. On Number 265 transparent light blue glass encloses an opaque yellow core, an attractive combination. With the single-color opaque glass beads, the most common color is turquoise (Nos. 249–251, 253, 254, 260, 262, 268, 276). Light green (No. 262), blue (No. 264), and black (No. 257) also occur.

Among the multicolored beads (Nos. 277–292), the combination of black with a white spot or spots is popular. The spots were made by applying blobs of glass to the matrix, or gather of glass. When the spots have been flattened down to the level of the surface of the matrix they are called flush spots. Other colors that appear are green, yellow, red, turquoise, blue, and gray. The glass is usually opaque. Wire-wound or wound beads were made by winding hot glass around a bead mold or core (see Gam, "Experiments in Glass," p. 262, fig. 1, p. 264). One bead with insets of mosaic canes was found (No. 289), a technique similar to that of the game piece Number 162.

It is too early to say very much about the beads; little is known about beads in the early Islamic society of Iran. Dating these small relics is problematic and is not attempted in the entries. Beads from Nishapur of materials other than glass have been published in Jenkins and Keene, *Islamic Jewelry*, pp. 30–32, no. 11. Somewhat related material from uncontrolled excavations can be found in Fukai, *Persian Glass*, pls. 45ff. For beads excavated in the Ctesiphon region, probably of late Sasanian or early Islamic date, compare Kröger, *Parthisches... Glasfunde von Ktesiphon*, nos. 427ff. A bead from Samarra was published by Lamm, *Glas von Samarra*, no. 301, fig. 62.

Spherical or near-spherical beads

247. Bead

Transparent(?) yellowish. Corrosion
L. 0.6 cm; Diam. 1.1 cm
Excavation date and exact provenance unknown
MMA 48.101.90f

Flattened globular bead.

---

248. Bead

Dark blue. Weathered
L. 0.6 cm; Diam. 0.7 cm
Excavation date and exact provenance unknown
MMA 48.101.90r

Small flattened globular bead with collars at perforation ends.

---

249. Bead

Opaque turquoise
L. 0.6 cm; Diam. 0.8 cm
Excavation date and exact provenance unknown
MMA 48.101.180b

Small flattened globular bead of wound glass.

---

250. Bead

Opaque light turquoise
L. 0.5 cm; Diam. 0.5 cm
Excavation date and exact provenance unknown
MMA 48.101.90k(?)

Small spherical bead.

---

251. Bead

Opaque turquoise
L. 0.5 cm; Diam. 0.6 cm
Excavation date and exact provenance unknown
MMA 48.101.79b

Irregular spherical bead. Pierced at one end, but perforation does not extend through to other end of bead.

---

252. Bead

Green; bubbles
L. 0.6 cm; Diam. 0.7 cm
Excavation date and exact provenance unknown
MMA 48.101.90p

Slightly flattened spherical bead.

---

253. Bead

Opaque or transparent turquoise; weathered
L. 0.6 cm; Diam. 0.8 cm
Excavation date and exact provenance unknown
MMA 48.101.90j

Slightly flattened spherical bead.

---

254. Bead

Opaque light turquoise
L. 0.6 cm; Diam. 0.9 cm
Excavation date and exact provenance unknown
MMA 48.101.192e

Flattened sphere.

Reference: Jenkins and Keene, *Islamic Jewelry*, no. 11.

---

255. Bead

Transparent yellow (now corroded) over an opaque turquoise core
L. 0.7 cm; Diam. 0.8 cm
Excavation date and exact provenance unknown
MMA 48.101.79

Small spherical bead.

256. Bead

Colorless. Iridescence
L. 0.8 cm; Diam. 0.9 cm
Excavation date and exact provenance unknown
MMA 48.101.90b

Spherical bead, one end broken revealing hollow interior.

---

257. Bead

Opaque black. Some corrosion
L. 0.9 cm; Diam. 1.0 cm
Excavation date and exact provenance unknown
MMA 48.101.90x

Slightly flattened spherical bead.

---

258. Bead

Transparent(?) blue. Corroded
L. 0.9 cm; Diam. 1 cm
Excavation date and exact provenance unknown
MMA 48.101.90s

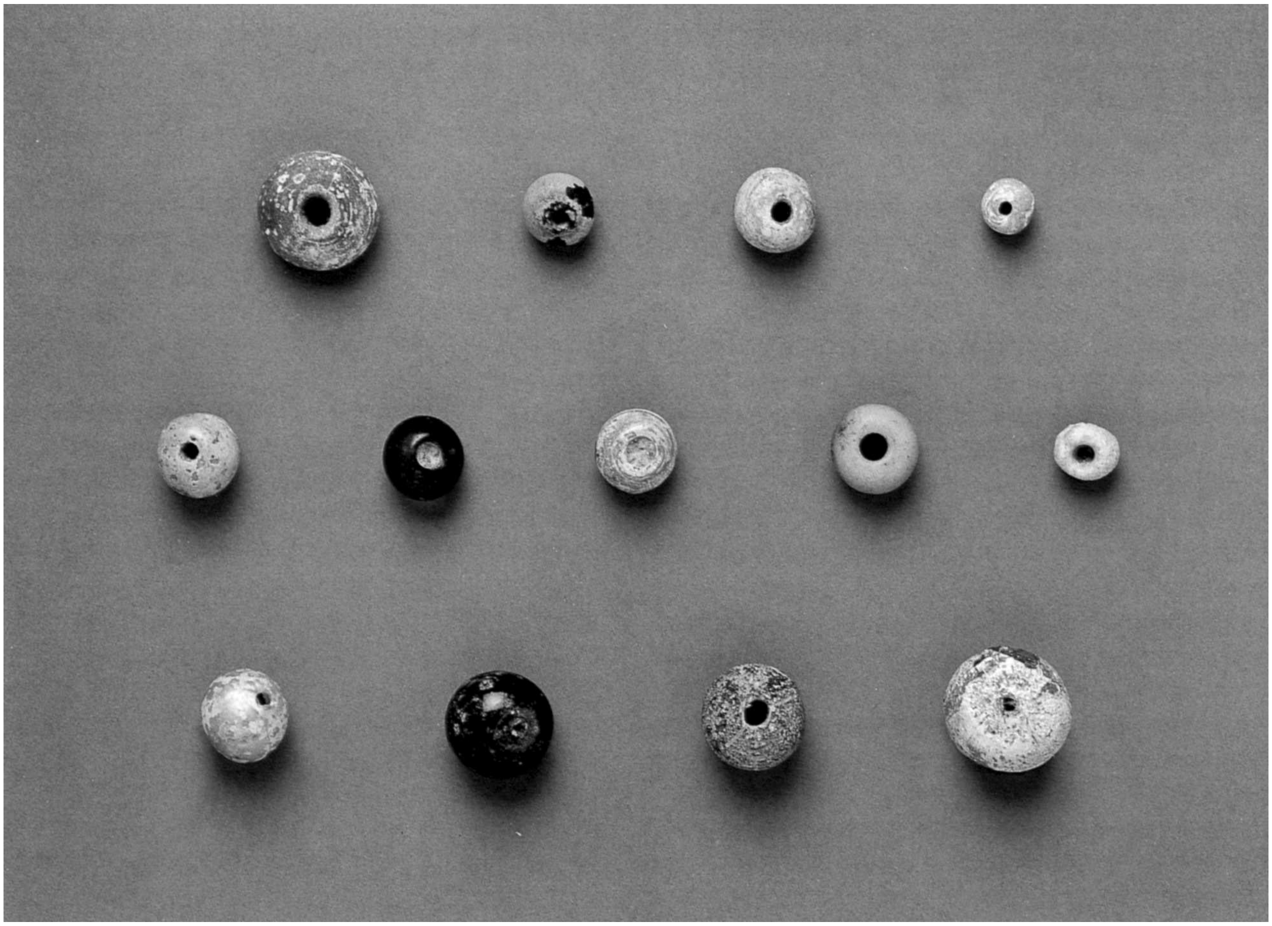
Spherical bead.

---

259. Bead

Colorless(?). Extensive iridescence
L. 0.9 cm; Diam. 1.2 cm
Excavation date and exact provenance unknown
MMA 48.101.209a

Flattened spherical bead with very small perforation.



247–259

Beads with flat sides parallel to the perforation

260. Bead

Opaque turquoise
L. 1 cm; Diam. 0.9 cm
Excavation date and exact provenance unknown
MMA 48.101.192

Barrel-shaped bead with two flattened sides.

Reference: Jenkins and Keene, *Islamic Jewelry*, no. 11.

---

261. Bead

Dark blue
L. 1.1 cm; Diam. 0.9 cm
Excavation date and exact provenance unknown
MMA 48.101.90u

Cracked, chipped. Barrel-shaped bead with two sides flattened.

Reference: Jenkins and Keene, *Islamic Jewelry*, no. 11.

---

262. Bead

Opaque turquoise
L. 1.2 cm; Diam. 1.2 cm
Excavation date and exact provenance unknown
MMA 48.101.192b

Chipped bead in shape of a flattened circle.

263. Bead

Opaque or transparent blue
L. 1 cm; Diam. 0.8 cm
Excavation date and exact provenance unknown
MMA 48.101.90t

Bead of irregular oval shape with two flattened sides.

Near-cylindrical beads

264. Bead

Opaque light green
L. 0.7 cm; Diam. 0.5 cm
Excavation date and exact provenance unknown
MMA 48.101.90v(?)

Irregular pear-shaped bead.

---

265. Bead

Transparent light blue over an opaque yellow core
L. 0.7 cm; Diam. 0.5 cm
Excavation date and exact provenance unknown
MMA 48.101.90q

Cylindrical bead.

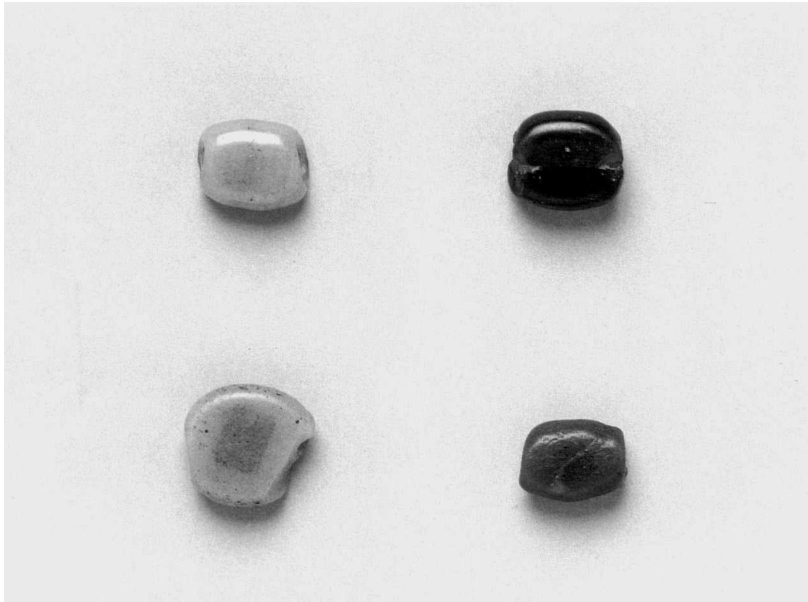
Reference: Jenkins and Keene, *Islamic Jewelry*, no. 11.

---

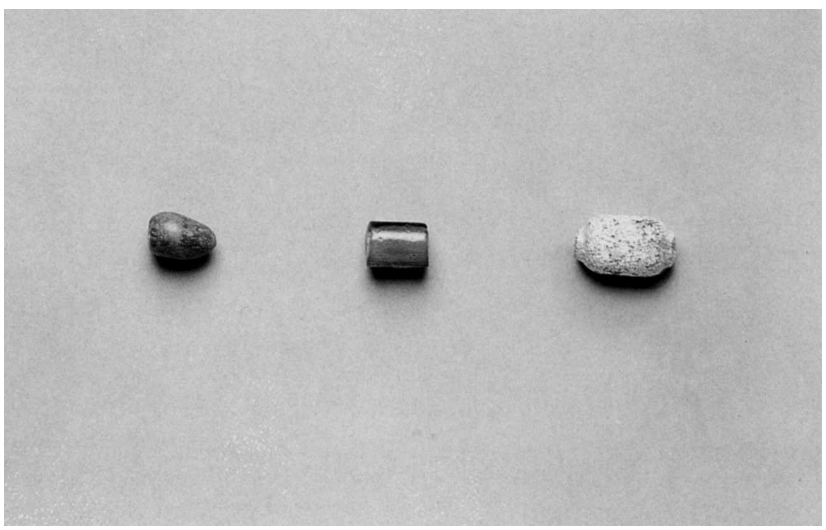
266. Bead

Green(?). Corrosion; iridescence
L. 1.1 cm; Diam. 0.6 cm
Excavation date and exact provenance unknown
MMA 48.101.180a

Flattened cylindrical bead with collars at ends.



260–263



264–266

Faceted beads

267. Bead

Dark (emerald) green
L. 1 cm; Diam. 0.8 cm
Excavation date and exact provenance unknown
MMA 48.101.86d

Bead with one side curved (convex) and other side irregularly faceted.

---

268. Bead

Opaque(?) turquoise. Corroded
L. 1.5 cm; Diam. 0.6 cm
Excavation date and exact provenance unknown
MMA 48.101.90i

Long, irregularly faceted hexagonal bead.

---

269. Bead

Dark (emerald) green
L. 1 cm; Diam. 0.5–0.55 cm
Excavation date and exact provenance unknown
MMA 48.101.86a

Faceted bead of standard bicone shape.

Reference: Jenkins and Keene, *Islamic Jewelry*, no. 11.

---

270. Bead

Dark (emerald) green
L. 1.1 cm; Diam. 0.5–0.55 cm
Excavation date and exact provenance unknown
MMA 48.101.86b

Faceted bead of standard bicone shape.

Reference: Jenkins and Keene, *Islamic Jewelry*, no. 11.

271. Bead

Dark (emerald) green
L. 1.2 cm; Diam. 0.5 cm
Excavation date and exact provenance unknown
MMA 48.101.86c

Faceted bead of standard bicone shape.

Beads of special shape

272. Cubic bead

Color not determinable. Extensive iridescence
L. 0.8 cm; Diam. 0.8 cm
Excavation date and exact provenance unknown
MMA 48.101.90d

Bead in shape of slightly irregular cube.

---

273. Bead

Blue
L. 0.3 cm; Diam. 0.6 cm
Excavation date and exact provenance unknown
MMA, no number

Annular (ring-shaped) bead.

---

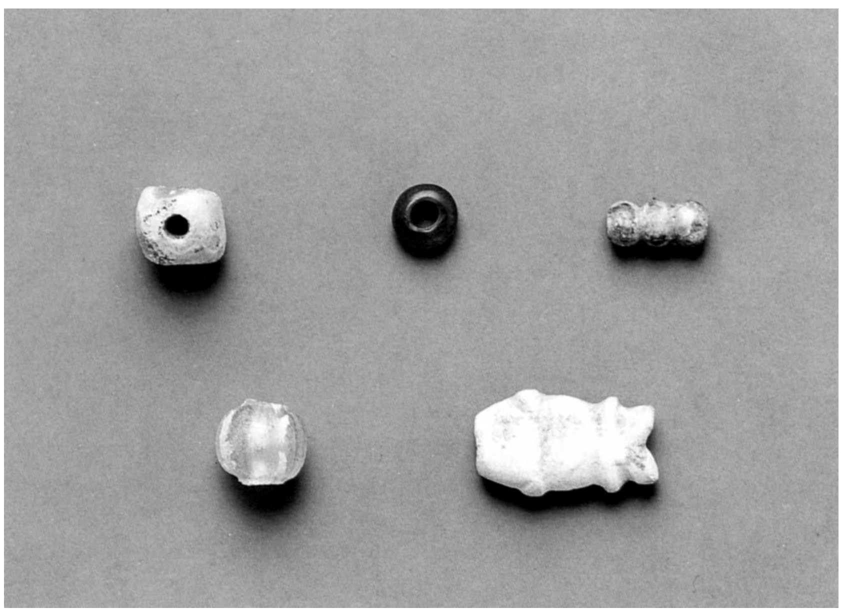
274. Bead

Color not determinable. Corroded
L. 1.0 cm; Diam. 0.5 cm
Excavation date and exact provenance unknown
MMA 48.101.90a

Three-section segmented bead.



267–271



272–276

275. Bead

Colorless. Corrosion; iridescence
L. 0.7 cm; Diam. 0.8 cm
Excavation date and exact provenance unknown
MMA, no number

Fluted spherical bead.

276. Bead

Opaque turquoise, now completely covered with white corrosion
L. 1.8 cm; Diam. 1.1 cm
Excavation date and exact provenance unknown
MMA 48.101.235

Fish-shaped bead, perforated lengthwise. Head, tail, and fins formed by wheel-cutting.

Eye beads

277. Bead

Opaque black with opaque white
L. 0.8 cm; Diam. 0.5 cm
Excavation date and exact provenance unknown
MMA 48.101.209i

Small, wound, two-part segmented bead, black with white spots.

278. Bead

Opaque black with opaque white and blue
L. 0.7 cm; Diam. 0.7 cm
Excavation date and exact provenance unknown
MMA 48.101.84d

Small, barrel-shaped; black with white raised spots with blue centers.

279. Bead

Opaque black with opaque white and opaque blue. Corrosion
L. 0.9 cm; Diam. 1 cm
Excavation date and exact provenance unknown
MMA 48.101.209g

Small circular bead, black with white spots with blue centers.

280. Bead

Opaque black with opaque white and opaque blue. Slight corrosion
L. 1.1 cm; Diam. 1.3 cm
Excavation date and exact provenance unknown
MMA 48.101.209e

Flattened spherical bead with white spots with blue centers.

281. Bead

Color not discernible, with opaque white. Corrosion
L. 1.3 cm; Diam. 1.2 cm
Excavation date and exact provenance unknown
MMA 48.101.209f

Irregular barrel-shaped bead with opaque white spots with centers of indiscernible color.

282. Bead

Color not determinable, with opaque blue and green. Corrosion
L. 1.2 cm; Diam. 1.1 cm
Excavation date and exact provenance unknown
MMA 48.101.84c

Irregular cylindrical bead with blue and green spots.



277–287

283. Bead

Opaque yellow, red, and white. Heavily corroded
L. 1.1 cm; Diam. 1.7 cm
Excavation date and exact provenance unknown
MMA 48.101.84a

Flattened globular bead.

---

284. Bead

Opaque black with opaque white and gray. Slight corrosion
Representative L. 1.4 cm; Diam. 1.3 cm
1939; exact provenance unknown
MMA 40.170.700

Black barrel-shaped bead with opaque white spots with gray centers. Found with five other eye beads which have now been identified as modern.

---

285. Bead

Black with opaque yellow, red, green, turquoise, and white
L. 1 cm; Diam. 1.6 cm
1939; exact provenance unknown
MMA 40.170.701a

Spherical black bead with a large irregularity on one side and spots of various colors.

---

286. Bead

Transparent blue-green with opaque yellow and white
L. 2.1 cm; Diam. 2 cm
1939; exact provenance unknown
MMA 40.170.701b

Cylindrical blue-green bead with yellow zigzag line and white raised spots.

287. Bead

Color not determinable, with opaque white or yellow and opaque red. Corrosion
L. 2.4 cm; Diam. 0.6 cm
Excavation date and exact provenance unknown
MMA 48.101.209h(?)

Long cylindrical bead, perhaps of folded glass. White or yellow spots with red centers.

The apparent folding of the glass may have been caused by marvering the hot bead on a marverstone too quickly. Cylindrical beads were usually made by marvering (see Gam, "Experiments in Glass," pp. 264–65).

Wire-wound beads

288. Bead

Black and white
L. 1.6 cm; Diam. 1.8 cm
Excavation date and exact provenance unknown
MMA 48.101.218

Spherical bead with wound and combed black and white chevron pattern.

For a combed pattern, a thread or threads are applied to the glass matrix or core of the bead and then the threads are dragged alternately up and down with an instrument (see Tait, ed., *Glass, 5000 Years*, p. 215).

---

289. Bead

Yellow with unidentifiable colors
L. 1.3 cm; Diam. 1.6 cm
1947(?); exact provenance unknown
MMA 48.101.84b

Flattened spherical bead of wound yellow glass inlaid with four slices of cane mosaic.

Reference: Jenkins and Keene, *Islamic Jewelry*, no. 11.

290. Bead

Greenish with opaque yellow, red, green, white, and black
L. 1.2 cm; Diam. 2 cm
1939; exact provenance unknown
MMA 40.170.701c

Short barrel-shaped bead of transparent greenish glass with threads of colors named above.

---

291. Bead

Opaque black, white, and yellow. Corrosion
L. 2 cm; Diam. 2 cm
1939; exact provenance unknown
MMA 40.170.701d

Cylindrical wire-wound bead of black and white marvered glass with crossing zigzag lines of opaque yellow creating lozenges, and spots of opaque white, flush to the surface, in the centers of the lozenges.

---

292. Bead

Opaque black, transparent (color not determinable), and probably opaque white. Slight iridescence
L. 3.3 cm; Diam. 1 cm
Excavation date and exact provenance unknown
MMA 48.101.?

Long spindle-shaped bead.



288–292

Appendixes

APPENDIX 1

Two Glass Slabs and Analyses of Them

Two slabs were unearthed in the northern part of the mound at Qanāt Tepe during the 1939 excavations. They were found with several wasters of glazed earthenware as well as spurs and kiln debris; thus, as Charles Wilkinson pointed out, they may be remains from the production of glazed pottery, probably alkaline-glazed ware (Wilkinson, *Nishapur: Pottery*, p. xxxii; idem, *Nishapur: . . . Buildings*, p. 262). A chemical analysis was done of samples from each piece, together with fragments of glaze that were probably from the earthenware wasters, in 1972–73 at The Metropolitan Museum of Art (Conservation Reports, van Zelst file 1972/73, Reports on Nishapur). The goal, it seems, was either to find compositional similarities, constituting analytic proof that the glass slabs had been formed during the production of the glazed earthenware, or to find differences in composition, which would allow the slabs to be connected instead to a hypothetical Nishapur glass production.

The results are not—and in my opinion could not have been—conclusive. They merely show a similar concentration of manganese in the two slabs. Since no documentation on the purpose of the chemical analyses or on the interpretation of their results was found, the interpretation offered here is entirely my own as a nonchemist.

1. Slab

1939; Qanāt Tepe, northern part
Green (a mixture of bluish and yellowish green)
L. 8.4 cm; Th. 2.7–3.9 cm
MMA 40.170.415

Irregular slab of glass. On one side remains of slag(?).



Results of the chemical analysis of slab 1 are shown in Table 1.1.

Table 1.1. Concentration of Oxides by Percentage in Two Samples

	Green glass from slab MMA 40.170.415	Colorless glaze MMA 40.170.578
Na_2O	5.7%	8.6%
K_2O	3.0%	2.7%
Fe_2O_3	1.1%	0.8%
MnO	0.70%	360ppm
CoO	36ppm	7ppm

The greenish color of the glass may be due to its high manganese content. Except for different concentrations of manganese, the glass and the glaze are of comparable composition.

A spectrographic analysis of this slab was made in 1968 by National Spectrographic Laboratories, Inc. The results are shown in Table 1.2.

Table 1.2. Detection of Elements in Glass Slab MMA 40.170.415

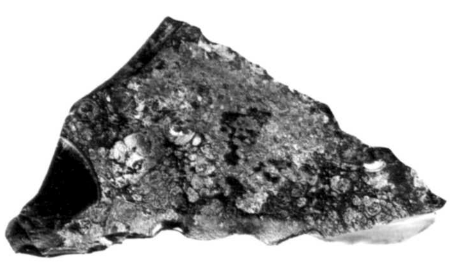
Range	Element
Greater than 10%	Si
5–25%	Al, Ca
1–10%	Mg, Na
.5–5%	Fe, Mn, K
.05–.5%	Cu, Ni, Ti
.01–1%	Pb, Ba
.005–.05%	B, Cr, Sn, Li
Less than .01%	V
Not detected	Ag, Bi, Cb, Cd, Co, Mo, Sb, Sr, W, Zn, Zr, As

---

2. Slab

1939; Qanāt Tepe, northern part
Dark blue. Iridescence
L. 8.7 cm; Th. 2.5–2.6 cm
MMA 40.170.414

Irregular slab of glass. On one side remains of slag.



Results of the chemical analysis of slab 2 are shown in Table 1.3.

Table 1.3. Concentration of Oxides by Percentage in Two Samples

	Blue glass from slab MMA 40.170.414	Blue glaze MMA 38.40.293
Na_2O	12.4%	12.0%
K_2O	3.0%	1.3%
FE_2O_3	1.0%	2.8%
MnO	0.66%	350ppm
CoO	0.043%	0.39%

The blue color of both glass and glaze appears to be due to the presence of cobalt pigments. Note that the cobalt concentration in the glass is one tenth that in the glaze; nevertheless this concentration must be considered high enough to give an intense blue color. Note also that the manganese concentration in the glass, much higher than that in the glaze, is very similar to that in the other glass slab analyzed, MMA 40.170.415.

APPENDIX 2

Analyses of Some Glass Specimens

One of the goals Charles Wilkinson apparently hoped to reach was to establish compositional criteria for Nishapur glass, which would make it possible to confirm the existence of local or at least regional glass manufacture.

As part of a general study made in 1960 of the composition of ancient glass,[1] thirteen specimens from Nishapur were analyzed: Numbers 165, 180, 182, 184, 204, 217, 218, 225, 226, 228, and 235 in this catalogue, and two unidentified specimens. The analysis was done at the Brookhaven National Laboratory in Upton, New York, on the invitation of Ray W. Smith, chairman of the International Committee on Ancient Glass, and Dr. Edward V. Sayre of Brookhaven. Results of the analysis are shown in Table 2.1.

General results of the analysis were stated in a letter from Smith to Wilkinson:

> While all specimens indubitably belong to the "Early Islamic" group, they display certain divergencies from other regionally different series of early Islamic glass. For example, the magnesium content is systematically high. Whereas the group average and upper limit of expectancy are 4.9 and 6.5, respectively, only two of your specimens are below (slightly) the average, and seven of them exceed the maximum expectancy. Manganese contents tend to be above the Islamic average, but perhaps not enough to be diagnostic.
>
> You will note that the majority of the Nishapur specimens have an antimony content which falls below the limit of detection spectrographically, and only one exceeds appreciably the group average for antimony. This probably indicates, in fact it is a clear indication, that none of the raw materials used ever contained appreciable antimony. On the other hand, your lead contents run generally above Islamic averages. This is not surprising in view of the occurrence of lead in the vicinity (Merv?), the known production of Islamic lead glass, and the attendant possibility of introducing lead into other glass through the cullet procedure.[2]

For the antimony-rich glass of the excavations in Dura-Europos and the East Syrian region, which were analyzed in the same program, see Clairmont, *Glass Vessels...Dura-Europos*, pp. 151–52 and table 2, p. 6.

An analysis of two specimens of incised, or scratch-decorated, glass from Nishapur was done in 1991 by Mark T. Wypyski of the Sherman Fairchild Center for Objects Conservation at The Metropolitan Museum of Art. One specimen is from a translucent blue dish, Number 164, and the other from a colorless fragment, Number 165. Results of the analysis are shown in Table 2.2.

1. Published in Sayre and Smith, "Compositional Categories of Ancient Glass." Also see Smith, "Archaeological Evaluation of Analyses of Ancient Glass."
2. Ray Winfield Smith to Charles K. Wilkinson, December 24, 1960 (Department of Islamic Art, The Metropolitan Museum of Art).

Table 2.1. Concentration of Oxides by Percentage in Thirteen Nishapur Glasses

Cat. No.:	228	225	226	235	182	204
MMA no.:	39.40.101	40.170.129	48.101.263	48.101.59	48.101.262 a–b	40.170.226
Technical research no.:	215	216	217	384	385	386
Li_2O	.0023	.0039	.0047	.0025	.0056	.0044
Na_2O	12.49	12.73	—	12.73	13.82	12.08
K_2O	2.65	1.29	1.53	2.10	1.00	1.49
Rb_2O	.0015	.0022	.0021	.0050	.0033	.0046
MgO	7.66	7.42	5.95	6.21	8.13	7.84
CaO	8.15	6.90	7.46	7.57	8.66	10.10
SrO	.090	.078	.052	.061	.090	.096
BaO	.011	.0078	.011	.0055	.024	.013
B_2O_3	.047	.050	.056	.051	.059	.076
Al_2O_3	1.28	.95	1.31	1.21	1.09	1.28
P_2O_5	.099	.12	.056	.11	.074	.096
ZnO	—	.061	—	—	.094	—
Ag_2O	.00087	.00088	.00068	.0012	.0051	.011
SnO_2	.0041	.0017	—	.0010	.014	—
Sb_2O_5	—	.020	—	.017	.036	.022
PbO	.039	.064	.0015	.013	.032	.0066
Bi_2O_3	.012	.012	.0012	.0043	.031	.014
ZrO_2	.0076	.0059	.0091	.0063	.0061	.010
TiO_2	.058	.039	.068	.055	.048	.059
V_2O_5	.027	.022	.049	.012	.014	.017
Cr_2O_3	.0034	.0025	.0079	.0035	.0062	.0057
MnO	.55	.62	.52	.47	.77	.83
Fe_2O_3	.45	.38	.43	.48	.65	.52
CoO	.0031	.0046	.0013	.0089	.016	.0017
NiO	.0045	.033	.0030	.010	.18	.0055
CuO	.047	.097	.0033	.0028	.16	.020

— = Not detected.

Table 2.1. (cont.)

218	**217**	**184**	**165**	**180**	**Un-identified**	**Un-identified**
39.40.44	**39.40.43**	**48.101.261**	**48.101.278 a–b**	**48.101.19**		
387	**388**	**699**	**700**	**701**	**702**	**703**
.0042	.0046	—	—	.0069	.0069	—
25.50	13.07	—	—	—	9.46	—
1.25	.86	—	—	1.31	1.08	—
.0048	.0036	—	—	.0057	.0037	—
6.07	4.12	5.55	7.58	8.63	7.86	4.71
7.10	5.73	7.08	6.66	7.48	8.87	8.87
.058	.045	.065	.094	.12	.088	.086
.020	.011	—	—	.017	.012	—
.030	.043	.034	.051	.051	.053	.084
.82	.64	1.46	1.82	1.72	1.23	1.51
.10	.085	.049	—	.069	.13	—
—	—	—	.078	.074	—	—
.00043	.00025	.00031	.0019	.0014	.00079	.015
—	—	—	.0015	.0025	—	.052
—	—	—	—	—	—	.0035
.0096	.0030	.0074	.036	.039	.014	.053
.0024	.010	.0014	.014	.0058	.0017	.035
.0052	.0024	.010	.022	.024	.0067	.015
.047	.042	.074	.15	.13	.045	.091
.040	.023	.047	.041	.046	.024	.048
.0060	.0062	—	—	.0076	.0026	—
.71	.46	.39	1.07	1.33	.65	.82
.33	.30	.94	.85	2.75	.39	2.45
.0026	.0035	.0045	.028	.15	.0096	.015
.0055	.0025	.0025	.18	.0065	.029	.051
.048	.0055	.0079	.048	.15	.057	.26

Table 2.2. Concentration of Oxides by Percentage in Scratch-Decorated (Incised) Glasses from Nishapur

	Blue glass No. 164, MMA 40.170.131	Colorless glass No. 165, MMA 48.101.278a
Na_2O	15.4	13.7
MgO	4.4	5.7
Al_2O_3	1.6	1.0
SiO_2	65.5	69.9
K_2O	3.7	2.6
CaO	6.6	4.6
P_2O_5	—	—
SO_3	0.4	0.2
Cl	0.6	0.6
TiO_2	0.1	0.1
MnO	—	1.4
Fe_2O_3	1.4	0.6
CoO	0.1	—
NiO	—	—
CuO	—	—
ZnO	0.1	—
As_2O_3	—	—
Sb_2O_3	—	—
SnO_2	—	—
PbO	—	—

— = Not detected.

APPENDIX 3

Chemical Analyses of Some Glass Fragments from Nishapur in The Corning Museum of Glass

ROBERT H. BRILL, The Corning Museum of Glass

In The Corning Museum of Glass in Corning, New York, is a large collection of unaccessioned glass fragments of the Islamic period acquired in the 1950s. The fragments, presumably all surface finds, came from several locations in Iran and include a few hundred pieces from Nishapur.

Over the years, The Corning Museum has carried out chemical analyses of about 360 examples of Sasanian and Islamic-period glass,[1] some from the aforementioned collection but most from excavations. Altogether about twenty different sites throughout the Middle East are represented. Among the fragments analyzed are 44 from Nishapur. Judging from their shapes, these fragments represent a variety of types of blown vessels and date from the ninth and tenth centuries. Samples of two scratch-decorated, or incised, glasses excavated at Nishapur and now in The Metropolitan Museum of Art were also analyzed. Brief descriptions of the Nishapur samples analyzed are given below.

Quantitative analyses for the major and minor oxides, as well as for the colorants and other additives, were carried out by atomic absorption. These were supplemented by semiquantitative emission spectrographic analyses for trace elements. Silica was estimated by difference.[2] Most of the analyses were performed by Brandt A. Rising and his coworkers at Umpire and Control Services, Inc., West Babylon, New York, but a few electron microprobe analyses were done by Philip M. Fenn and Carl W. Ponader, both of Corning, Inc.

Chemical Compositions of Nishapur Glasses

The analyses of the Nishapur glasses are reported in Tables 3.1 to 3.3. In addition to the raw data, reduced compositions, calculated by normalizing seven major and minor oxides to 100%, are also reported. The reduced compositions, in which some of the compositional effects of intentional additives have been removed, provide a more reliable basis than the raw data for comparing compositions of glasses with one another. The individual oxides in the reduced compositions are designated by an asterisk (*).

1. Most of these analyses are unpublished, but they will appear soon in a monograph reporting all of the glass analyses carried out by The Corning Museum of Glass. Also see R. H. Brill, "Thoughts on the Glass of Central Asia with Analyses of Some Glasses from Afghanistan," *Proceedings, 15th International Congress on Glass, Leningrad, 1989: Archaeometry*, ed. O. V. Mazurin (Leningrad, 1989); and R. H. Brill, "Chemical Analyses of Some Glasses from Ctesiphon," forthcoming in Kröger, *Parthisches... Glasfunde von Ktesiphon*.
2. Analytically this leaves something to be desired, because it does not provide the useful check of showing how well the results close on 100%. The decision to estimate SiO_2 by difference was made on a cost basis, since this permitted us to analyze almost twice as many samples on a limited budget. Occasional separate determinations of SiO_2 routinely check within ±1.5 absolute percent or better.

As expected, the Nishapur glasses are all soda-lime-silica glasses (Na_2O:CaO:SiO_2). The relatively high levels of potassium and magnesium oxides (K_2O and MgO in excess of about 1.5%) indicate that the glasses were made with soda derived from plant ashes, rather than with natron. Although phosphorus was not sought in all of the analyses, the eight samples that were analyzed yielded values of 0.23% to 0.98% P_2O_5. This finding is consistent with the use of plant ash as the alkali.

Plant ash was continuously employed as an alkali in the inland regions of the Near East, starting with the beginnings of glass-making there and extending some 3,500 years through the history of glass-making. In fact, plant ashes were still being used at the small glass factory in Herat as late as 1977.[3]

Figures 3.1 to 3.5 are plots of selected pairs of oxides for the Nishapur glasses. The crosses represent data for various colors of glass ranging from the natural aqua produced by iron impurities through greens and blues. (For brevity, we here refer to these simply as "colored" glasses, remembering though that they also include the "uncolored" aqua glasses.) The circles are data for specimens of colorless glass bearing faceted or cut decoration, familiar types of luxury glass in the ninth and tenth centuries. It is immediately apparent from the graphs that the compositions of the colored glasses are distinctly different from those of the cut, colorless glasses. This can also be seen in Table 3.4, which shows mean compositions of both groups along with 90% confidence limits around the mean values.[4]

The colorless glasses were clearly something special, and special efforts had been taken to make them as nearly free of color as possible. They contain manganese (reported as the chemical form MnO), which in ancient times served as a decolorizer, offsetting the natural aqua color of iron impurities.[5] That the use of manganese as a decolorizer was not always successful is readily apparent from Table 3.1. Several of the glasses there, which are colored, also contain substantial levels of manganese. This is very often the case among Islamic-period glasses, a great many of which contain in excess of about 0.3% MnO.[6] Transmission curves for some of the glasses are shown in Figure 3.6 and discussed below in the section on physical properties.

But there is more to the story than that. In their efforts to produce water-white glass, possibly in imitation of rock crystal, the glassmakers must have realized that the natural aqua color of most of their glasses was in some way connected to the raw materials used. When making the colorless glass, the glassmakers must have searched out special raw materials which (although they wouldn't have known it) contained less iron than the materials they ordinarily used. This is evident from the analyzed iron contents; the colorless glasses are significantly lower in iron than the other glasses. The difference is apparent in Figure 3.4 and also in Table 3.4. There are other chemical differences, too. For example, the colorless glasses (not unexpectedly) form a tighter group, chemically. They are also significantly lower in soda and alumina, but higher in magnesia and silica, all of which reflects a marked dif-

3. For information on the use of plant ash soda, see Brill, Barag, and Oppenheim, "Chemical Interpretation of the Texts," and *The Glassmakers of Herat*, a 30-minute documentary film produced by Elliot Erwitt for The Corning Museum of Glass, copyright 1977. For information on the use of natron see Brill, "Scientific Investigations of the Jalame Glass."
4. One way of looking at these ranges is: if the samples used to calculate the means are, indeed, a statistical population, then 90% of the members of that population will have values falling within the stated limits.
5. A background impurity level of about 0.05% MnO is commonly found in ancient glasses. We do not begin to think of manganese as being an intentional additive until the MnO value reaches or exceeds ≈0.15%. For information on the use of manganese as a decolorizer see Brill, "Scientific Investigations of the Jalame Glass," and R. H. Brill and J. W. H. Schreurs, "Iron and Sulfur Related Colors in Ancient Glasses," *Archaeometry* 26 (1984), Part 2, pp. 199–209.
6. There are three or four reasons why in many instances manganese might not have been effective as a decolorizer in ancient glass. For example, the manganese concentration might have been too low, the atmosphere of the furnace might have been too reducing, or the manganese when introduced into the batch might have been in a chemically reduced state—in which case it could not have functioned as a decolorizer. Manganese introduced in the form of recycled cullet could very well already have been in a reduced state.

ference between the actual batch materials used for making the two different types of glass. Differences also show up in the trace elements: the colorless glasses are slightly lower in titanium, barium, strontium, and zinc.

Whether or not the marked compositional differences between the so-called colored glass and the colorless, cut glass groups result from their having originated in different places cannot presently be decided from the analytical data alone. It is just as possible that the two types of glass were made in the same locale but with different batch materials.

Some further classifications can be made within the two chemical groups. For example, the colored glasses can be subdivided on the basis of their chemical contents into two groups of nine fragments each, with five others being more or less intermediate between them.[7] (Only number 3082, a small green bottle with facet cutting, seems to differ significantly from the others in its levels of several oxides.) The discrepancies are about what one would expect from variability in raw materials and/or glass-making procedures over a relatively short term. The same is true among the colorless glasses, where a very tight chemical grouping of about twelve of the fragments suggests that they are from vessels made in the same factory at about the same time. The other fragments differ slightly from them in one or two oxides.

Comparisons with Other Islamic-Period Glasses

The compositions of the colored and colorless Nishapur glasses (the surface finds) have also been compared with those of glasses from other Islamic sites in the Middle East. The comparisons were generally based on the six major and minor oxides used for calculating the reduced compositions (except SiO_2*). In all, comparisons were made with more than three hundred glasses belonging to nineteen typological or locational groups.

Among all these glasses, the composition of colored glass from Nishapur matches only two groups closely and matches three groups for all oxides except one. The colorless Nishapur glasses are entirely unlike all but one (or possibly two) of the other groups.

These are the inferences that can be drawn solely from chemical analytical observations:

Comparisons with the colored glasses from Nishapur:

6 scratch-decorated (incised) glasses of unknown provenance; probably 8th–10th century. A very close match.

12 glasses from Choche (Iraq); 3rd–early 5th century. A good match.

1 small yellowish dish from the Famen Temple in China; A.D. 874 or earlier. A possible match.

17 glasses from Ctesiphon (Iraq); Sasanian and Islamic periods. A possible match (Nishapur Na_2O* is higher).

24 glasses from Jezaziyat (Iraq); 2nd–6th century. A possible match (Nishapur MgO* is somewhat lower).

3 glasses from Tell Umm Jirin (Iraq); 5th–6th century. A possible match (Nishapur MgO* is somewhat lower).

Comparisons with the colorless glasses from Nishapur:

11 glasses from Fusṭāṭ (Egypt), ten colorless and one blue; 9th–13th century(?). A good match.

5 colorless glasses from Qaṣr al-Ḥayr (Syria); Islamic period. A possible match.

7. The groups, formed according to criteria selected somewhat arbitrarily, are: nos. 5300, 5301, 5331, 5303, 5304, 5330, 5332/5333, and 3080; and nos. 3081, 3083, 5305, 5306, 5307, 5308, 5335, 5328, and 5334. A different view of which oxide similarities are most significant for glass-making would produce different groupings.

Neither of the Nishapur groups could be regarded as matching the compositions of glasses from these other groups: Fusṭāṭ (natron type), Qaṣr al-Ḥayr (natron type and bracelets), Sīrāf and Takht-i Sulaimān in Iran, the Serçe Limanı wreck, several central Asian sites, Qsar es-Seghir (Morocco), luster glasses (natron or plant ash types), and scratch-decorated glasses (natron type).

The chemical match between the colorless Nishapur glasses and our analyzed examples from Fusṭāṭ is noteworthy. Eight of the Fusṭāṭ samples came from colorless glass vessels of which at least four, and probably more, have wheel-cut decoration. Another Fusṭāṭ fragment comes from a small, thin-walled, dark blue bottle with a long, drawn neck. (Its chemical composition is closer still to that of the colored Nishapur glasses, and its shape must have been very similar to that of the samples numbers 5332/5333, the blue bottle[s] from Nishapur.) In addition, the Fusṭāṭ samples include two pieces of colorless cullet, one containing purplish streaks. The analyses match so well that one is tempted to speculate that these particular Fusṭāṭ glasses were made in the same place as the Nishapur colorless glasses; and if that is so, it invites some tantalizing questions. Were they all made at (or near) Nishapur? Were they all made at (or near) Fusṭāṭ? Or were they made somewhere else and exported to both those places? Someday we shall very likely learn the answers to these questions.

The close match between the colored Nishapur glasses and the scratch-decorated glasses is also especially interesting. These vessels, bearing geometric and/or floral motifs, are found throughout the Islamic world. Jens Kröger has told this author that examples are known from Fusṭāṭ, Raqqa, al-Mīnā, Samarra, Dwin, Susa, and Nishapur. Our analyses[8] of such glasses indicate that both natron and plant ash scratch-decorated glasses were made—almost certainly in different glass-making centers.

One of the finest examples of scratch-decorated glass is the large, fragmentary plate excavated at Nishapur and now in The Metropolitan Museum of Art (MMA 40.170.131; No. 164). It is number 6365 in the present study. Its analysis agrees well with those of smaller fragments of two very similar plates in Corning (our analysis nos. 6349 and 6350). All three are dark blue and are plant ash glasses. The difference is mainly that the two Corning fragments contain intentionally added manganese. It is likely that all three plates were made in the same place as the Nishapur colored glasses because their chemical analyses are quite similar.

Interestingly, while the dark blue fragment from Nishapur (no. 6365) is a fairly good match for the colored Nishapur glasses, the "colorless" fragment (no. 6345) is closer to the colorless group.

We strongly suspect—and Dr. Kröger seems similarly inclined[9]—that these glasses have a bearing on the attribution of another remarkable group of scratch-decorated blue glasses: those uncovered at the Famen Temple in Shaanxi Province, China, and dated A.D. 874 or earlier.[10] Chemical analyses of those glasses might settle the matter of their uncertain origin, especially now that the Nishapur compositions have been established.

There is another possible glass link between the Famen Temple and Nishapur: two small, yellowish-transparent, straight-sided bowls found among the treasures in the crypt.[11] These unimposing bowls are notable because raised ridges on the interior surround concentrically the gentle kick produced by the pontil attachment on the exterior of the base. Dr. Kröger notes above (p. 56) that the same feature appears on at least three glasses excavated at Nishapur: two cups, Numbers 37 and 38, and a dish, Number 150. He adds, however, that glasses with similar raised ridges have been found elsewhere as well (for example, at Ctesiphon, Samarra, Seleucia [Iraq], Pella, and sites in Egypt).

8. The individual analyses are unpublished but they are alluded to in Brill and Fenn, "Some Thoughts on the Famen Temple Glass Finds." Also see Brill, "Glass and Glassmaking."
9. Personal communication.
10. See note 8.
11. Fenn, Shi Meiguang, and Brill, "Addendum to Chapter 4."

A chemical analysis of the Famensi bowl with the interior ridge (no. 5886) shows that its composition is rather like a composite of the other four glasses reported with it in Table 3.3. This reinforces the idea that the Famensi glasses came from Nishapur; however, the matches are not close enough for certainty, and it is possible that glasses made elsewhere could provide equally close matches. We plan to explore all these questions further.[12]

One especially interesting observation is that one of the subgroups of Nishapur colored glasses is quite similar, chemically, to three fragments of pattern-molded glass and two other vessel fragments from the Serçe Limanı shipwreck.[13] The compositions of the five Serçe Limanı fragments, in turn, differ somewhat from those of the hundred or so other glasses from the wreck that have been analyzed. The five Serçe Limanı glasses could conceivably have been made in the same factory as these particular Nishapur glasses (nos. 5303, 5304, 5330, 5331, and 5332/5333). One of these Nishapur fragments is pattern molded, but its pattern does not closely resemble those on the three Serçe Limanı pattern-molded pieces.

Physical Properties of Nishapur Glasses

Some incidental experiments were also carried out. John E. Geiger of Corning, Inc., obtained an X-ray diffraction pattern for the white opaque glass in a large eye bead from the Nishapur group (no. 5336). The pattern showed that the white colorant-opacifier phase is tin oxide, SnO_2. Although little is known about the opacifiers used in opaque Islamic glasses—which are, in fact, rather rare—this was the expected result. The only other plausible candidate would have been the calcium antimonate ($Ca_2Sb_2O_7$) used in Roman times, but that was gradually replaced by tin oxide from about the second to fourth century onward. Antimony is rarely found in any form in Near Eastern Islamic-period glass. The identification of tin oxide is also consistent with the use of tin in white and yellow opaque enamels on Islamic glasses. The analysis of the dark blue base glass of another eye bead (no. 5335) agrees with that of Nishapur vessels of colored glass; thus the bead was very likely made nearby, if not in the exact same place as, those colored glasses.

Over the years we have assembled at the Corning Museum a library of physical property measurements of representative ancient glasses from many places and periods. These data can be useful in attempts to reconstruct ancient glassmaking processes. Table 3.5 shows the results of measurements of several properties of Nishapur glasses. For those especially interested, a full viscosity-temperature curve for the glass can be estimated from the data. Such a curve defines all the thermal working properties of a given glass. The compositions of the particular glasses studied are included in Tables 3.1 and 3.2.

Among the other physical properties, Knoop hardness values are reported for two Nishapur glasses, one colorless and the other green (nos. 5320 and 5307). The differences in their chemical compositions had no measurable effect on the hardness, for which the values agree within experimental error. Therefore the differences in chemical compositions would not have made the colorless glass any easier to cut than the more ordinary colored glasses,[14] and the selection of

12. A third glass from the Famensi, a small bowl with dense yellow-opaque lusterlike decoration, may have parallels from Nishapur, for example a fragment with yellow-opaque luster in Berlin, I.2/63, said to come from that city; see Klein and Zick-Nissen, *Islamische Keramik*, no. 20 (communication J. Kröger). Dr. Kröger knows of other examples of this color from Samarra and Takht-i Sulaimān. The analysis of a similar fragment in Corning, of unknown provenance, showed that the technology by which this easily recognized dense yellow stain is produced is similar to that used for making common amber or yellow transparent luster stains. See Brill, "Chemical Studies."
13. Unpublished analyses. For the Serçe Limanı shipwreck see Bass, "Nature of the Serçe Limani Glass."
14. We have estimated from similar measurements on other glasses, both ancient and modern, that a reduction of 20–25 units on the hardness scale would make a glass noticeably easier to cut. That change could be brought about by the addition of $\approx$15% PbO.

special raw materials for making the colorless glasses was effective for controlling the color only, not the cutting properties.

Concerning color, we measured transmission spectra for three of the analyzed Nishapur glasses and for one dark blue glass from Gurgān which in chemical composition is very close to the blue glasses from Nishapur. The curves were obtained by James Saxe of Corning, Inc. (see Fig. 3.6).

The curve for number 5323, a typical example of Nishapur colorless cut glass, is nearly level throughout the visible spectrum of approximately 400 to 700 millimicrons. This is consistent with its colorless, water-white appearance. (It contains 0.53% MnO as a decolorizer.) The curve for number 5308 shows the bluish aqua color typical of so many Roman and Islamic soda-lime glasses. It is the "natural" color produced by iron impurities introduced with the raw materials, and the color one would expect to see in a glass melted under neutral or slightly reducing conditions. The curve has a substantial transmission in the blue and green regions of the visible spectrum, but it slopes off toward the red region as a consequence of the presence of ferrous iron, which absorbs in the red and infrared. (This glass contains 0.90% Fe_2O_3 and only 0.065% MnO.)

The curves for the two blue glasses, numbers 5331 (a medium blue) and 5350 (a dark blue), are also shown. The curves have the same shape because they contain the same coloring species, but the more intense blue color of number 5350, caused by a higher concentration of cobalt oxide, displaces its curve downward. The transmission peaks at about 540mμ and 610mμ and the substantial transmission near 700mμ are all characteristic of cobalt as a colorant.

Lead Isotope Analyses

Lead isotope analyses can often be used for learning more about where ancient objects could or could not have been made. An analysis can be done on an extremely small sample of any ancient material containing lead. It is carried out on a mass spectrometer and yields numerical ratios characterizing the lead analyzed. Comparing such ratios makes it possible to classify objects, grouping those that could have been made with leads from the same mining regions and separating others that must have been made with leads from different regions. Under the most favorable conditions, it is possible to match the ratios for an object with those of ores from particular regions, thus identifying the places where the lead could possibly have originated. The technique has been applied to many ancient glasses.[15] There are, however, certain precautions to be kept in mind when interpreting any archaeological lead isotope data: namely, the problems of mixing and overlapping.

Most of the Nishapur glasses contain traces of about 0.00x% lead (PbO), but a few of the dark blue glasses contain somewhat higher traces (≈0.0x%), which we believe were introduced with their cobalt colorants. This is often the case with ancient glasses—for example, some blue glasses of Roman date and most dark blues of post-Roman dates. Lead isotope analyses were carried out on two Nishapur glasses: number 5335, the dark blue from the eye bead, and number 3080, a dark blue vessel fragment. The analyses were performed by Emile C. Joel and I. Lynus Barnes at the National Institute of Standards and Technology in Gaithersburg, Maryland. The results are reported in Table 3.6, where it can be seen that the leads are very much alike isotopically—similar enough to be regarded as probably having come from the same mining region, possibly even the same mine. It should be remembered that the lead in dark blue glasses tells us more about the origins of the cobalt col-

15. For examples, see: Barnes et al., "Lead Isotope Studies . . . Serce Liman Shipwreck"; R. H. Brill, I. L. Barnes, and B. Adams, "Lead Isotopes in Some Ancient Egyptian Objects," in *Recent Advances in Science and Technology of Materials*, 3 (New York and London: Plenum Press, 1974), pp. 9–27; R. H. Brill, "Scientific Studies of the Panel Materials," in L. Ibrahim, R. Scranton, and R. H. Brill, *Kenchreai, Eastern Port of Corinth* (Leiden: E. J. Brill, 1976), pp. 225–55.

orant than about the origins of the glasses. Nevertheless, the finding is of some importance. When combined with the fact that the chemical compositions of the two examples are similar, it supports the inference that eye beads were made in the same general region as the vessel glasses excavated at Nishapur. Thus, eye beads found at Nishapur were not necessarily imported from some distant place of manufacture.

Among some two thousand other artifacts we have analyzed, only eighteen contain lead isotopically similar to those in the two Nishapur glasses. Eight of these might be considered a good to close match, while the remainder are only fair matches. As the table shows, most of these artifacts were found in Turkey or Iran.

Only one ore, a galena from Akdağmadeni in Turkey, can be considered an isotopic match for the two blue glasses. However, more recent analyses of Turkish ores collected in the Taurus Mountains by Ashlihan Yener may include ores that match. Some of her samples come from mines believed to have been worked for cobalt in ancient times. Several of the leads we have analyzed so far in dark blue glass (from Byzantine and western European stained-glass windows, for example) are of an isotopic type that we believe occurs in the vicinity of Qum and Kāshān (central Iran), not far from cobalt deposits said to have been worked on a small scale in the recent past.[16] With further lead isotope analyses it should someday be possible to locate the actual sources of cobalt used for glass-making in ancient times.

Acknowledgments

The author thanks Dr. Jens Kröger for his many valuable remarks on the glass excavated at Nishapur, as well as Ruth Sprague and Sherri Seavey for their assistance in preparing the typescript and Ruth Kozodoy for many helpful editorial suggestions. He also thanks those who conducted the chemical analyses and other laboratory work. Their names appear on the appropriate pages of the text and with the tables that follow.

16. Robert H. Brill and Lynus Barnes, "The Flight into Egypt, from the Infancy of Christ Window (?): Some Chemical Notes," in Summer McKnight Crosby et al., *The Royal Abbey of Saint-Denis in the Time of Abbot Suger (1122–1151)*, exh. cat., The Metropolitan Museum of Art (New York, 1981), p. 81.

Catalogue of Samples Analyzed

All samples are surface finds from Nishapur and appear to date between the ninth and tenth centuries. Most are moderately to heavily weathered.

Vessels of various colors

3080 Fragments of vessel. Blue. (Same as Pb-1196.)

3081 Bottle with wheel-cut decoration. Dark green.

3082 Base of small, narrow, thick-walled bottle (?) with facet cutting. Dark green.

3083 Rim and neck fragment of thin-walled blown vessel. Greenish aqua.

5300 Thick-walled vessel, molded dimples on base, loops and vertical lines on wall. Strong aqua.

5301 Bottle, possibly molded. Bluish aqua.

5302 Bottle base, possibly molded. Pale yellowish green.

5303 Wide rim, thin threading. Pale greenish aqua.

5304 Base of vessel, molded dimples on base, loops on wall. Strong aqua.

5305 Handle, pincered. Strong bluish aqua.

5306 Base of small vessel, molded scrolls. Yellowish green.

5307 Bottle base, molded dimples. Green.

5308 Base of heavy vessel with high kick, molded radiating lines. Bluish green.

5309 Base of narrow, thin-walled vessel, mold blown. Pale green, black weathering.

5310 Thick, flattened rim of large nine-sided flask. Bluish green.

5326 Neck fragment, two applied ridges. Colorless (included with colored glasses because of its compositional similarity to them).

5328 Neck fragment, thick applied rings. Medium blue.

5329 Neck fragment, molded lines(?). Medium blue.

5330 Wall fragment. Dark blue.

5331 Neck fragment with flaring rim. Medium blue.

5332 Narrow neck of small bottle. Dark blue.

5333 Neck of small bottle. Dark blue. (From a bottle similar to 5332, or, possibly, the same bottle.)

5334 Rim of small squat-necked bottle. Dark bluish green.

5335 Eye bead. Dark blue transparent with white opaque designs; sample is of blue glass. (Same as Pb-1129.)

5336 Eye bead 5335; sample is of white opaque glass.

6349 Base fragment of large plate preserving two applied feet (of three?). Dark blue. Scratched decoration with seven-lobed floret, hatching, and rope design. Corning Museum of Glass, 55.1.110.

6350 Base fragment of large plate without feet. Dark blue. Scratched decoration showing floret of eight spiked petals alternating with four-lobed blossoms, hatching, leaves, rope, and pinecone(?) motifs. Corning Museum of Glass, 55.1.111.

Pb numbers are numbers of lead isotope samples in The Corning Museum of Glass.

COLORLESS VESSELS

360 Bowl rim. Colorless. Used for viscosity determination. (Not analyzed in this study.)

1824 Beaker base, cut. Colorless.

3078 Neck and shoulder of heavy-walled cut bottle. Colorless.

3079 Dish with straight short sides. Colorless.

5311 Handle with thumb rest. Colorless.

5312 Rim fragment, pincered looped design. Colorless.

5313 Vessel base, molded dimples. Colorless.

5314 Wall fragment, cut linear and ellipsoidal designs. Colorless.

5315 Rim fragment, shallow-cut foliate designs. Colorless.

5316 Rim fragment, shallow-cut linear designs. Colorless.

5317 Bottle neck, cut. Colorless.

5318 Bottle neck, deep cut. Colorless.

5319 Beaker base, cut curvilinear designs. Colorless.

5320 Bottle neck and wall, cut. Colorless.

5321 Wall fragment, deep cut circular design. From Torbadad (Iran). Colorless.

5322 Neck fragment, cut. Colorless.

5323 Thick flattened rim of flask. Colorless.

5324 Rim fragment, pincered nine-pointed design. Colorless.

5325 Wall fragment, pincered looped design. Colorless.

5327 Molar bottle, deep cut. Bluish aqua (natural Fe).

EXCAVATED FRAGMENTS

6345 Fragment of a plate(?); excavated at Nishapur (No. 165). Scratched decoration with triangular and rope motifs. Colorless, iridescent. The Metropolitan Museum of Art, 48.101.178a. (Lent by Carolyn Kane.)

6365 Fragment of a large plate; excavated at Nishapur (No. 164). Scratched decoration with motif of five-spike leaf, among others. Dark blue, moderately weathered. The Metropolitan Museum of Art, 40.170.131. (Sample provided by M. Wypyski.)

5886 Chip of a cup found in Famensi, Shaanxi Province; placed in the crypt A.D. 874 or earlier. From a thin-walled, straight-sided cup with an interior ridge concentric with a shallow kick. Pale yellow transparent, lightly weathered. Analysis done in collaboration with Shi Meiguang of China Building Materials Academy, Beijing.

Table 3.1. Chemical Analyses of Some Nishapur Glasses of Various Colors (as weight percentages)

Sample no.:	3080	3081	3083	5300	5301	5302
SiO_2	67.2	61.6	63.2	67.3	68.4	60.4
Na_2O	13.6	17.6	16.7	15.7	14.6	16.5
CaO	6.25	5.6	6.91	7.38	5.91	7.26
K_2O	2.01	2.69	3.09	2.17	3.15	5.83
MgO	3.34	3.13	4.7	3.07	2.77	4.24
Al_2O_3	1.84	3.19	3.19	2.98	3.54	3.57
Fe_2O_3	3.69(?)	1.14	1.14	0.97	0.78	0.71
TiO_2	0.2	0.35	0.2	0.25	0.2	0.2
Sb_2O_5	—	—	—	—	—	—
MnO	0.59	0.61	0.06	0.052	0.54	1.15
CuO	0.2	3.66	0.001	0.001	0.005	0.003
CoO	0.005	—	—	—	—	—
SnO_2	0.001	0.005	0.005	—	—	—
Ag_2O	—	0.003	0.001	0.001	0.001	0.001
PbO	0.05	0.09	0.005	0.005	0.005	0.001
BaO	0.05	0.1	0.06	0.02	0.05	0.03
SrO	0.2	0.08	0.2	0.08	0.05	0.05
Li_2O	0.01	0.005	0.008	0.005	0.005	0.005
Rb_2O	0.005	0.005	0.005	—	—	—
B_2O_3	0.09	0.06	0.04	0.02	0.02	0.02
V_2O_5	0.005	0.005	0.005	0.005	0.005	0.005
Cr_2O_3	0.008	0.005	0.005	—	—	—
NiO	0.15	0.005	0.005	—	—	—
ZnO	0.1	0.1	0.1	0.008	0.007	0.012
ZrO_2	—	—	—	0.01	0.01	0.01
Bi_2O_3	0.001	0.001	0.001	—	—	—
P_2O_5	0.39	0.64	0.4	ns	ns	ns

REDUCED COMPOSITIONS (see page 211)

SiO_2*	68.63	64.63	63.87	67.58	68.97	61.31
Na_2O*	13.89	18.67	16.89	15.77	14.73	16.75
CaO*	6.38	5.94	6.99	7.41	5.96	7.37
K_2O*	2.05	2.85	3.12	2.18	3.18	5.92
MgO*	3.41	3.32	4.75	3.08	2.80	4.30
Al_2O_3*	1.88	3.38	3.23	2.99	3.57	3.62
Fe_2O_3*	3.77(?)	1.21	1.15	0.97	0.79	0.72
T*	100.00	100.00	100.00	100.00	100.00	100.00

*Reduced composition calculated by normalizing oxides to 100%. — = Not detected. ns = Not sought.

Table 3.1 (cont.)

Sample no.:	5303	5304	5305	5306	5307	5308
SiO_2	70.6	66.5	62.3	64.8	65	63.5
Na_2O	13.4	15.9	18.1	17	16.4	17.8
CaO	6.52	8.61	7.95	6.9	6.96	7.66
K_2O	3.1	2.51	2.56	2.5	2.79	3.18
MgO	2.44	3.14	3.81	3.95	4.04	3.38
Al_2O_3	2	2.08	3.36	3	3.28	3.15
Fe_2O_3	0.52	0.95	1.08	1.05	1.1	0.9
TiO_2	0.2	0.2	0.2	0.2	0.2	0.2
Sb_2O_5	—	—	—	—	—	—
MnO	0.95	0.03	0.42	0.46	0.053	0.065
CuO	0.005	0.001	0.005	0.001	0.001	0.001
CoO	—	—	—	—	—	—
SnO_2	—	—	—	—	—	—
Ag_2O	0.001	0.001	0.001	0.001	0.001	0.001
PbO	0.05	—	0.01	—	—	—
BaO	0.08	0.005	0.08	0.05	0.02	0.06
SrO	0.05	0.05	0.05	0.05	0.05	0.08
Li_2O	0.005	0.005	0.005	0.005	0.005	0.005
Rb_2O	—	—	—	—	—	—
B_2O_3	0.02	0.02	0.02	0.02	0.02	0.02
V_2O_5	0.005	0.005	0.005	0.005	0.005	0.005
Cr_2O_3	—	—	0.005	0.005	0.005	0.005
NiO	—	—	0.005	0.005	0.005	0.005
ZnO	0.009	0.005	0.012	0.011	0.007	0.008
ZrO_2	0.01	0.01	0.01	0.01	0.01	0.01
Bi_2O_3	—	—	—	—	—	—
P_2O_5	ns	ns	ns	ns	ns	ns

Reduced Compositions

SiO_2*	71.63	66.70	62.83	65.31	65.30	63.76
Na_2O*	13.59	15.95	18.25	17.14	16.46	17.88
CaO*	6.61	8.64	8.02	6.96	6.99	7.70
K_2O*	3.14	2.52	2.58	2.52	2.80	3.19
MgO*	2.47	3.15	3.84	3.98	4.06	3.40
Al_2O_3*	2.03	2.09	3.39	3.02	3.29	3.16
Fe_2O_3*	0.53	0.95	1.09	1.06	1.10	0.90
T*	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.1 (cont.)

Sample no.:	**5309**	**5310**	**5326**	**5328**	**5329**	**5330**
SiO_2	64.4	67.7	66.2	61.1	64.8	67.9
Na_2O	15.2	17.3	17.6	19.3	18.2	14.4
CaO	8.01	5.47	6.66	6.74	4.78	7.59
K_2O	3.9	2.31	2.95	3.58	3.78	2.15
MgO	4.67	2.77	3.75	4.53	4.27	3.02
Al_2O_3	1.58	1.91	1.51	2.49	1.9	1.43
Fe_2O_3	1	0.86	0.66	1.18	1.15	2.47
TiO_2	0.2	0.2	0.2	0.2	0.15	0.15
Sb_2O_5	—	—	—	—	—	—
MnO	0.9	1.34	0.35	0.63	0.63	0.18
CuO	0.005	0.003	0.001	0.09	0.07	0.42
CoO	—	—	—	0.03	0.05	0.1
SnO_2	—	—	—	—	—	—
Ag_2O	0.001	0.001	0.001	0.001	0.001	0.001
PbO	0.001	—	0.003	0.003	0.001	0.005
BaO	0.02	0.08	0.02	0.02	0.08	0.01
SrO	0.05	0.05	0.03	0.03	0.03	0.03
Li_2O	0.005	0.005	0.005	0.005	0.005	0.01
Rb_2O	—	—	—	—	—	—
B_2O_3	0.02	0.02	0.02	0.02	0.02	0.03
V_2O_5	0.005	0.005	0.005	0.005	0.005	0.005
Cr_2O_3	—	—	—	—	0.005	0.005
NiO	—	—	—	—	0.01	0.05
ZnO	0.009	0.014	0.01	0.033	0.012	0.066
ZrO_2	0.01	0.01	0.01	0.01	0.01	0.01
Bi_2O_3	—	—	—	—	—	—
P_2O_5	ns	ns	ns	ns	0.29	0.24

Reduced Compositions

SiO_2*	65.21	68.84	66.65	61.77	65.45	68.53
Na_2O*	15.39	17.60	17.72	19.51	18.45	14.59
CaO*	8.11	5.57	6.70	6.81	4.85	7.69
K_2O*	3.95	2.35	2.97	3.62	3.83	2.18
MgO*	4.73	2.82	3.77	4.58	4.33	3.06
Al_2O_3*	1.60	1.94	1.52	2.52	1.93	1.45
Fe_2O_3*	1.01	0.88	0.66	1.19	1.17	2.50
T*	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.1 (cont.)

Sample no.:	**5331**	**5332**	**5333**	**5334**	**5335**	**3082**
SiO_2	68	65.7	65.5	59.9	63.6	57.2
Na_2o	17.1	14.1	14.5	18.2	14.9	21.6
CaO	4.07	8.22	8.22	6.82	6.33	8.05
K_2O	3.84	1.88	1.88	3.32	3.33	1.78
MgO	1.74	2.97	2.97	3.8	4.44	4.69
Al_2O_3	2.85	1.64	1.69	3.77	3.11	3.86
Fe_2O_3	1.07	1.88	1.88	1.03	2.19	1.07
TiO_2	0.25	0.15	0.15	0.2	0.08	0.2
Sb_2O_5	—	—	—	—	—	—
MnO	0.82	2.65	2.48	0.72	1.57	0.06
CuO	0.06	0.3	0.34	2.03	0.24	0.001
CoO	0.05	0.2	0.2	—	0.06	—
SnO_2	—	0.001	0.001	0.005	0.005	0.005
Ag_2O	0.001	0.001	0.001	0.001	—	0.001
PbO	0.003	0.003	0.003	0.02	0.05	0.005
BaO	0.05	0.08	0.05	0.04	0.02	0.05
SrO	0.03	0.03	0.03	0.03	0.03	0.2
Li_2O	0.005	0.01	0.01	0.005	0.001	0.01
Rb_2O	—	—	—	—	—	0.005
B_2O_3	0.02	0.03	0.03	0.02	0.02	0.04
V_2O_5	0.005	0.005	0.005	0.005	—	0.005
Cr_2O_3	0.005	0.005	0.005	0.005	—	0.08
NiO	0.01	0.05	0.05	0.01	0.005	0.005
ZnO	0.012	0.036	0.038	0.015	0.051	0.1
ZrO_2	0.01	0.01	0.01	0.01	0.01	—
Bi_2O_3	—	—	—	—	—	0.001
P_2O_5	ns	ns	ns	ns	ns	0.98

Reduced Compositions

SiO_2*	68.92	68.18	67.76	61.87	64.95	58.22
Na_2O*	17.33	14.62	15.01	18.79	15.23	21.98
CaO*	4.12	8.52	8.51	7.04	6.47	8.19
K_2O*	3.89	1.95	1.95	3.43	3.40	1.81
MgO*	1.76	3.08	3.07	3.92	4.54	4.77
Al_2O_3*	2.89	1.70	1.75	3.89	3.18	3.93
Fe_2O_3*	1.08	1.95	1.95	1.06	2.24	1.09
T*	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.2. Chemical Analyses of Some Colorless Nishapur Glasses (as weight percentages)

Sample no.:	1824	3078	3079	5311	5312	5313
SiO_2	69.689	68.683	71.681	71.888	71.942	68.542
Na_2O	13.6	12.996	11.45	11.9	11.8	15.2
CaO	6.28	6.58	6.58	6.64	7.33	6.42
K_2O	2.2	2.78	1.8	2.76	2.34	3.13
MgO	6.11	7.39	5.63	4.75	4.91	5.34
Al_2O_3	0.91	0.69	0.9	1.15	1.12	0.83
Fe_2O_3	0.33	0.24	0.78	0.28	0.12	0.19
TiO_2	0.05	0.03	0.06	0.2	0.1	0.05
MnO	0.24	0.17	0.33	0.25	0.24	0.2
CuO	0.001	0.001	0.001	0.01	0.001	0.001
SnO_2	0.005	0.005	0.005	0.001	—	—
Ag_2O	0.001	0.001	0.001	0.001	0.001	0.001
PbO	0.005	0.005	0.005	0.07	0.001	0.001
BaO	0.08	0.02	0.05	0.005	0.02	0.02
SrO	0.1	0.2	0.15	0.05	0.03	0.03
Li_2O	0.008	0.008	0.006	0.005	0.005	0.005
Rb_2O	0.005	0.005	0.005	—	—	—
B_2O_3	0.04	0.01	0.01	0.02	0.02	0.02
V_2O_5	0.005	0.005	0.005	0.005	0.005	0.005
Cr_2O_3	0.005	0.005	0.005	—	—	—
NiO	0.005	0.005	0.005	—	—	—
ZnO	0.1	0.1	0.1	0.005	0.005	0.005
ZrO_2	—	—	—	0.01	0.01	0.01
Bi_2O_3	0.001	0.001	0.001	—	—	—
P_2O_5	0.23	0.07(?)	0.44	ns	ns	ns

Reduced Compositions (see page 211)

	1824	3078	3079	5311	5312	5313
SiO_2*	70.31	69.13	72.54	72.35	72.26	68.78
Na_2O*	13.72	13.08	11.59	11.98	11.85	15.25
CaO*	6.34	6.62	6.66	6.68	7.36	6.44
K_2O*	2.22	2.80	1.82	2.78	2.35	3.14
MgO*	6.16	7.44	5.70	4.78	4.93	5.36
Al_2O_3*	0.92	0.69	0.91	1.16	1.12	0.83
Fe_2O_3*	0.33	0.24	0.79	0.28	0.12	0.19
T*	100.00	100.00	100.00	100.00	100.00	100.00

*Reduced composition calculated by normalizing oxides to 100%. — = Not detected. ns = Not sought.

Table 3.2 (cont.)

Sample no.:	**5314**	**5315**	**5316**	**5317**	**5318**	**5319**
SiO_2	71.648	70.855	71.484	71.523	74.063	70.813
Na_2O	13.1	13.6	13.2	12.4	10.2	13
CaO	6.33	6.27	6.19	6.71	7.65	6.82
K_2O	1.89	2.4	2.37	1.96	2.26	2.56
MgO	4.8	5.32	5.21	4.88	3.43	5.13
Al_2O_3	1.26	0.88	0.88	1.21	1.09	0.99
Fe_2O_3	0.37	0.24	0.24	0.44	0.34	0.26
TiO_2	0.1	0.1	0.1	0.15	0.1	0.05
MnO	0.4	0.23	0.23	0.63	0.77	0.28
CuO	0.001	0.001	0.001	0.001	0.001	0.001
SnO_2	—	—	—	—	—	—
Ag_2O	0.001	0.001	0.001	0.001	0.001	0.001
PbO	0.001	0.01	0.001	0.001	0.001	0.001
BaO	0.02	0.02	0.02	0.02	0.02	0.02
SrO	0.03	0.03	0.03	0.03	0.03	0.03
Li_2O	0.005	0.005	0.005	0.005	0.005	0.005
Rb_2O	—	—	—	—	—	—
B_2O_3	0.02	0.02	0.02	0.02	0.02	0.02
V_2O_5	0.005	0.005	0.005	0.005	0.005	0.005
Cr_2O_3	—	—	—	—	—	—
NiO	—	—	—	—	—	—
ZnO	0.009	0.003	0.003	0.004	0.004	0.004
ZrO_2	0.01	0.01	0.01	0.01	0.01	0.01
Bi_2O_3	—	—	—	—	—	—
P_2O_5	ns	ns	ns	ns	ns	ns
Reduced Compositions						
SiO_2*	72.08	71.16	71.79	72.16	74.79	71.12
Na_2O*	13.18	13.66	13.26	12.51	10.30	13.06
CaO*	6.37	6.30	6.22	6.77	7.72	6.85
K_2O*	1.90	2.41	2.38	1.98	2.28	2.57
MgO*	4.83	5.34	5.23	4.92	3.46	5.15
Al_2O_3*	1.27	0.88	0.88	1.22	1.10	0.99
Fe_2O_3*	0.37	0.24	0.24	0.44	0.34	0.26
T*	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.2 (cont.)

Sample no.:	**5320**	**5321**	**5322**	**5323**	**5324**	**5325**	**5327**
SiO_2	71.973	70.053	71.123	72.161	72.773	69.653	70.555
Na_2O	12.2	13	12.2	12	12.8	13.5	12.4
CaO	6.74	7.39	6.95	6.59	6.45	6.9	7.09
K_2O	2.07	2.65	2.34	2.05	2.13	2.51	2.34
MgO	5.46	5.35	5.72	5.04	4.06	5.77	5.29
Al_2O_3	0.91	0.89	0.96	1.11	1.02	0.96	1.21
Fe_2O_3	0.25	0.22	0.27	0.37	0.29	0.3	0.44
TiO_2	0.05	0.05	0.05	0.05	0.05	0.05	0.05
MnO	0.25	0.3	0.29	0.53	0.33	0.26	0.49
CuO	0.001	0.001	0.001	0.001	0.001	0.001	0.005
SnO_2	—	—	—	—	—	—	—
Ag_2O	0.001	0.001	0.001	0.001	0.001	0.001	0.001
PbO	0.001	0.001	0.001	0.002	0.001	0.001	0.003
BaO	0.02	0.02	0.02	0.02	0.02	0.02	0.05
SrO	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Li_2O	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Rb_2O	—	—	—	—	—	—	—
B_2O_3	0.02	0.02	0.02	0.02	0.02	0.02	0.02
V_2O_5	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Cr_2O_3	—	—	—	—	—	—	—
NiO	—	—	—	—	—	—	—
ZnO	0.004	0.004	0.004	0.005	0.004	0.004	0.006
ZrO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Bi_2O_3	—	—	—	—	—	—	—
P_2O_5	ns	ns	ns	ns	ns	ns	ns

REDUCED COMPOSITIONS

SiO_2*	72.26	70.37	71.44	72.65	73.12	69.94	71.03
Na_2O*	12.25	13.06	12.25	12.08	12.86	13.56	12.48
CaO*	6.77	7.42	6.98	6.64	6.48	6.93	7.14
K_2O*	2.08	2.66	2.35	2.06	2.14	2.52	2.36
MgO*	5.48	5.37	5.75	5.07	4.08	5.79	5.33
Al_2O_3*	0.91	0.89	0.96	1.12	1.02	0.96	1.22
Fe_2O_3*	0.25	0.22	0.27	0.37	0.29	0.30	0.44
T*	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.3. Chemical Analyses of Some Scratch-Decorated (Incised) Glasses (as weight percentages)**

Sample no.:	**6345** (colorless)	**6365†** (dark blue)	**6349††** (dark blue)	**6350††** (dark blue)	**5886††** (yellowish)
SiO_2	69.4	65.2	64.6	62.6	65.8
Na_2O	13.5	14.8	15.1	16.2	15.1
CaO	4.34	6.65	7.46	7.77	5.12
K_2O	2.53	3.70	2.74	2.89	3.46
MgO	5.48	4.31	3.63	3.75	5.41
Al_2O_3	1.35	1.76	2.43	2.31	1.95
Fe_2O_3	0.46	1.85	1.38	1.22	0.40
MnO	1.27	0.04	0.94	1.68	1.52
CuO	0.01	0.07	0.14	0.16	0.01
CoO	—	0.065	0.05	0.05	—
ZnO	—	0.09	—	—	—
P_2O_5	0.5	0.4	0.30	0.41	0.13
REDUCED COMPOSITIONS (see page 211)					
SiO_2*	71.5	66.4	65.5	64.1	67.7
Na_2O*	13.9	15.1	15.3	16.6	15.5
CaO*	4.47	6.77	7.57	7.95	5.27
K_2O*	2.61	3.76	2.78	2.96	3.56
MgO*	5.65	4.38	3.68	3.84	5.56
Al_2O_3*	1.39	1.79	2.47	2.36	2.01
Fe_2O_3*	0.47	1.88	1.40	1.25	0.40
T*	100.00	100.00	100.00	100.00	100.00

— = Not detected.

* Reduced composition calculated by normalizing oxides to 100%.

** Electron microprobe analyses by Philip M. Fenn and Carl W. Ponader of Corning, Inc.

† An analysis of this sample by Mark Wypyski of The Metropolitan Museum of Art is in close agreement with these results.

†† Two fragments of scratch-decorated plates in The Corning Museum of Glass, and an undecorated cup from the Famen Temple. See references cited in notes 8 and 11.

Table 3.4. Mean Compositions and 90% Confidence Limits for Nishapur Glasses

	Various Colors (n=23)**			Colorless (n=19)		
		Mean			**Mean**	
SiO_2*	61.62	**66.05**	70.49	69.24	**71.54**	73.85
Na_2O*	13.69	**16.50**	19.32	11.07	**12.73**	14.40
CaO*	5.08	**6.93**	8.78	6.11	**6.77**	7.43
K_2O*	1.59	**3.03**	4.46	1.82	**2.36**	2.90
MgO*	2.32	**3.58**	4.83	3.98	**5.27**	6.56
Al_2O_3*	1.33	**2.61**	3.89	0.76	**1.00**	1.25
Fe_2O_3*†	0.37	**1.19**	2.01	0.09	**0.32**	0.54

* Reduced composition calculated by normalizing oxides to 100%.

** No. 3082 omitted altogether.

† No. 3080 omitted from Fe_2O_3*.

Table 3.5. Some Physical Properties of Nishapur Glasses

Sample no.	Density	Refractive index	Coefficient of linear expansion (0–300°); x 10^7/°C	Knoop hardness (N/100)
Colorless				
359	2.508g/cc	1.516	98.3	
360	2.490	1.516	91.2	
1824	2.485	1.516		
1825*	2.481	1.516		
5320	2.576	1.516	85.0	441
Green				
358*	2.522	1.520	101	
5307	2.539	1.528	102	448

Sample no.	Softening point	Annealing point	Strain point
Colorless			
359	690°	523°	486°
360	720	533	493
1824			
1825*			
5320	735		
Green			
358*	690°	504°	467°
5307	690		

Sample no.	Viscosity data log	temp.
1824	9	675°
	8	717
	7.65	733
	7	773
	6	856
1825*	9	670°
	8	712
	7.65	728
	7	768
	6	847

*Fragment from Gurgān; composition very similar to those of Nishapur glasses.

Density measurements by Joseph Giardina and James Saxe; index estimates by John F. Wosinski and Tom Cooper; expansion estimates by Loren Morse; hardness tests by Donald Millhollen; softness, etc. by Loren Morse; viscosity measurements by Eugene Fontana. All are with Corning, Inc.

Table 3.6. Lead Isotope Ratios in Two Nishapur Glasses

Sample no.		$^{207}Pb/^{206}Pb$	$^{208}Pb/^{206}Pb$	$^{204}Pb/^{206}Pb$
5335 (Pb-1129)	Dark blue glass from eye bead (0.05% PbO)	0.83797	2.07761	0.053451
3080 (Pb-1196)	Dark blue glass from vessel fragment (0.05% PbO)	0.83766	2.07684	0.053422

Some Leads Resembling Those in the Nishapur Glasses

Glasses

Pb-1013 Glass cane, red opaque, Egypt, Ptolemaic.
Pb-1025 Glass amulet, red opaque, Egypt, ca. 6th century B.C.
Pb-1027 Glass amulet, orange opaque, Egypt, ca. 6th century B.C.
Pb-1175 Cameo glass, dark blue, Roman.
Pb-1184 Glass tessera, dark blue, St. Demetrius, Thessaloniki, date uncertain.
Pb-1199 Cage cup fragment, dark blue glass, Roman.

Metals

Pb-115 Galena from old workings at Akdağmadeni, Turkey.
Pb-43 Metallic lead, Nippur, ca. 3500 B.C.
Pb-127 Bronze kohl pot, Hasanlu, 1000–800 B.C.
Pb-701 Bronze cauldron handle, Patnos, Turkey, 8th–7th century B.C.
Pb-724 Bronze head of a bull, Urartu, 8th century B.C.
Pb-1315 Lead strip, Farāʿīn, Egypt, probably Roman.
Pb-1320 Lead sheet, Sardis, Hellenistic.
Pb-1708 Lead net sinker, Serçe Limanı shipwreck, ca. 1025.
Pb-1720 As above.
Pb-1725 As above.
Pb-1731 As above.

Pb numbers are numbers of lead isotope samples in The Corning Museum of Glass.

Graphs for Nishapur Glasses

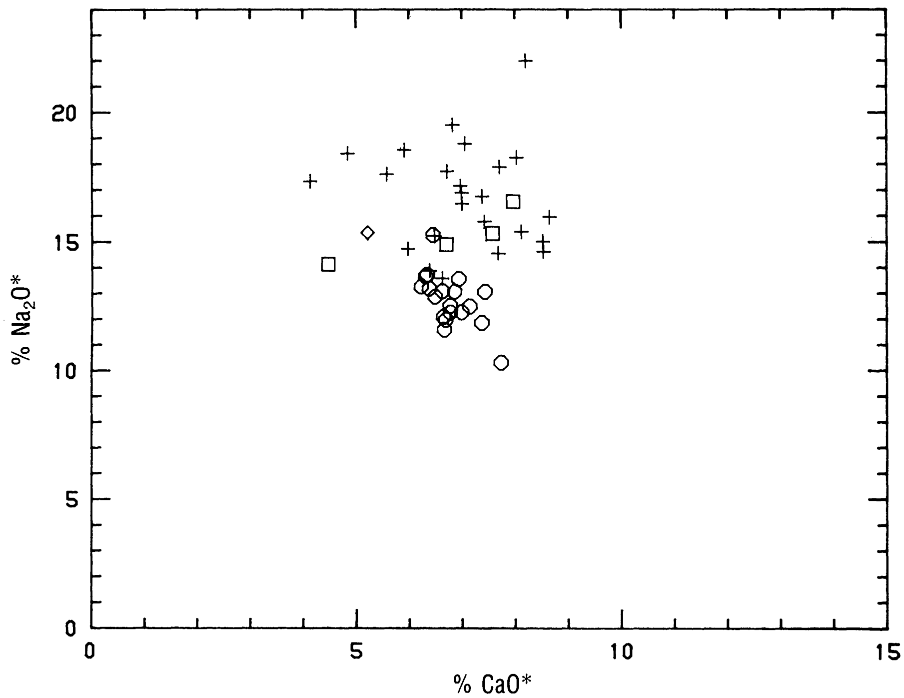


Figure 3.1. Na_2O^* *vs.* CaO^* plot for Nishapur glasses

For Figures 3.1–3.5:

○ = Colorless cut glass.

+ = Colored glass (including "natural" aqua glass).

□ = Scratch-decorated glass.

◇ = Glass found at the Famen Temple, China.

An asterisk denotes a reduced composition.

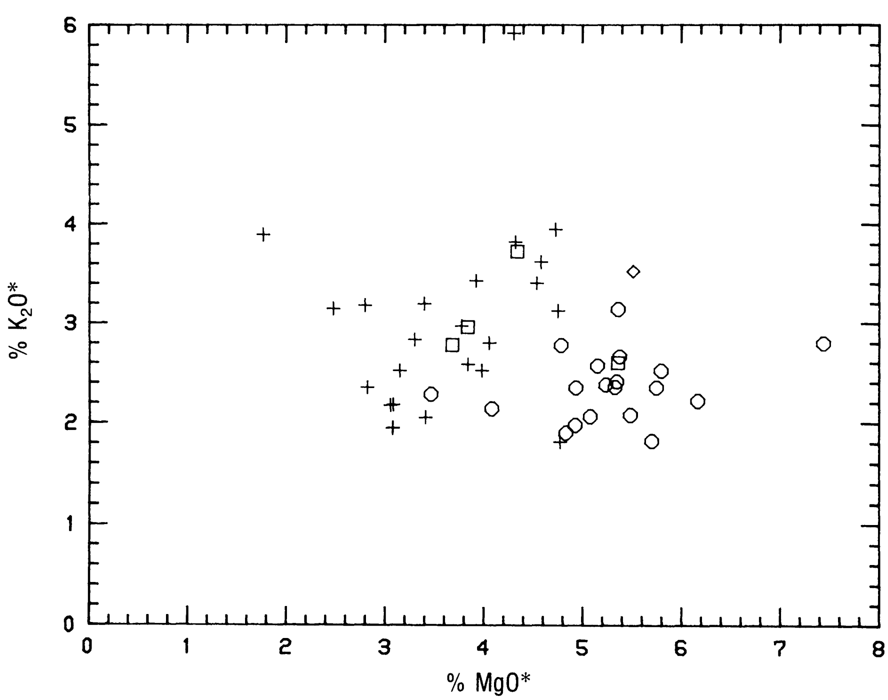


Figure 3.2. K_2O^* *vs.* MgO^* plot for Nishapur glasses

Graphs for Nishapur Glasses (cont.)

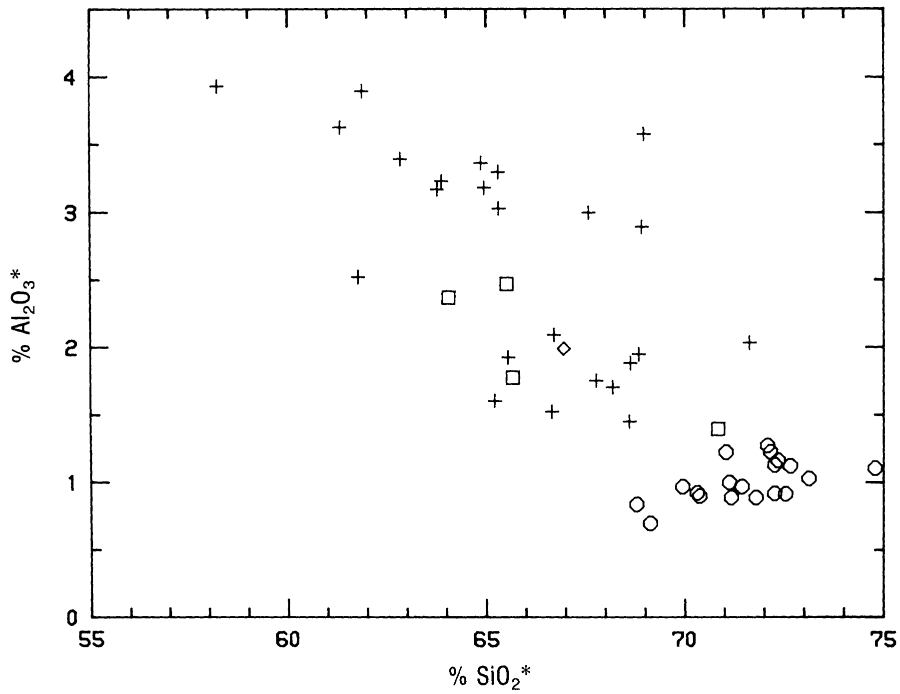


Figure 3.3. Al_2O_3* *vs.* SiO_2* plot for Nishapur glasses

For Figures 3.1–3.5:

○ = Colorless cut glass.

+ = Colored glass (including "natural" aqua glass).

□ = Scratch-decorated glass.

◇ = Glass found at the Famen Temple, China.

An asterisk denotes a reduced composition.

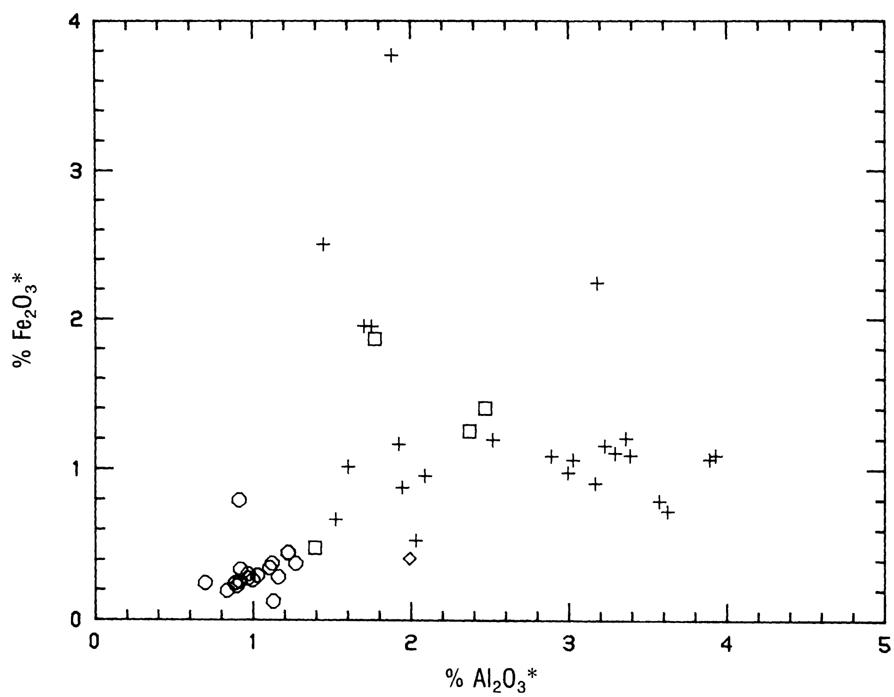


Figure 3.4. Fe_2O_3* *vs.* Al_2O_3* plot for Nishapur glasses

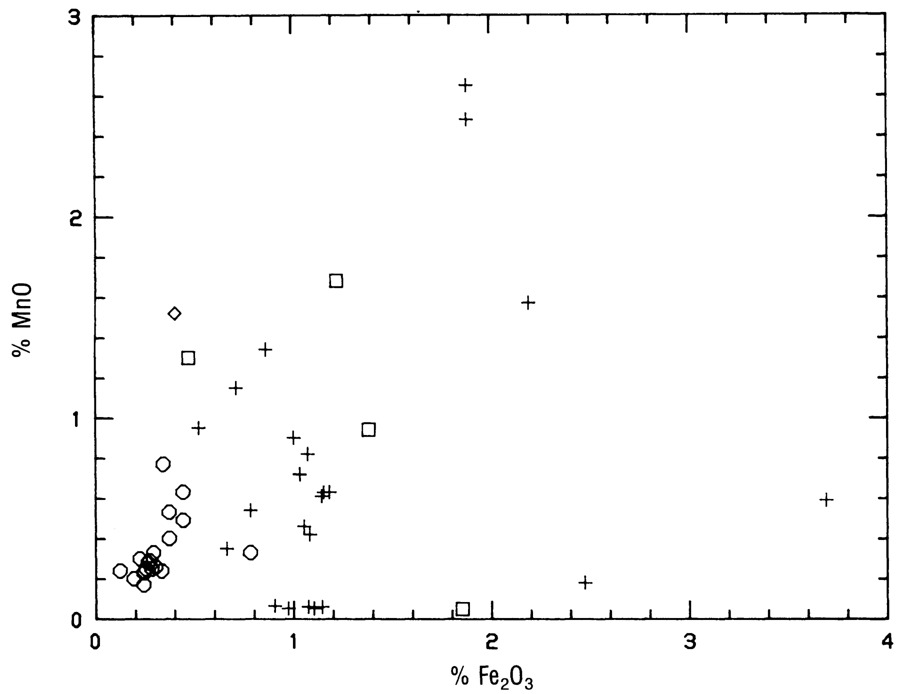
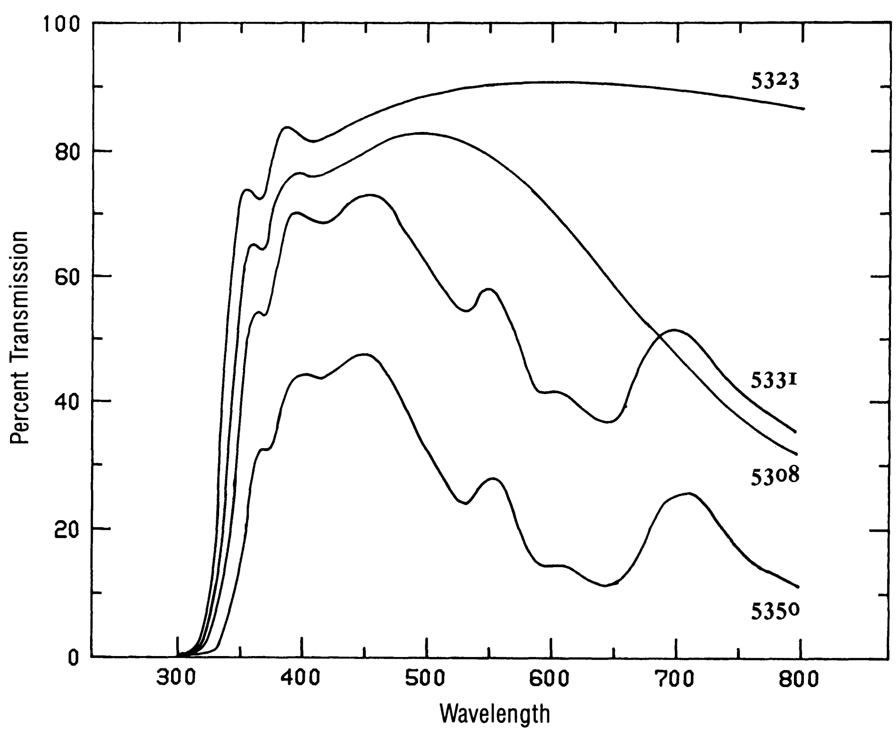


Figure 3.5. MnO *vs.* Fe_2O_3 plot for Nishapur glasses



5323: A typical colorless cut glass (0.37% Fe_2O_3, 0.53% MnO)

5308: A bluish aqua glass showing the "natural" color of iron impurities (0.90% Fe_2O_3, 0.065% MnO)

5331: A medium blue glass (0.05% CoO, 0.06% CuO, 1.07% Fe_2O_3, 0.82% MnO)

5350: A dark blue glass (0.10% CoO, 0.002% CuO, 0.59% Fe_2O_3, 1.00% MnO)

Figure 3.6. Transmission curves in the visible, near ultraviolet, and near infrared for glasses from Nishapur. Curves run by James Saxe of Corning, Inc.

Glossary

alembic An open vessel with a straight or curved spout emerging from the body, used in connection with a distillation apparatus in chemistry or alchemy experiments.

applied decoration Decoration achieved by the application of threads of soft glass to the surface of the object.

batch A mixture of raw materials that is heated in a crucible in a glass furnace.

beveled style A term applied to architectural decoration with a repetitive pattern in which the surface is beveled toward the curved outlines of the design. *See* slant-cut.

cane A thin rod or strip of glass.

collar ring A thick applied thread around the neck of a bottle.

combing A decorative technique in which bands of opaque colored glass are marvered into the surface of the glass until level and are then dragged or combed while still soft to form a repeating pattern.

corrosion Changes on or under the surface of the glass, produced by burial or other exposure to adverse conditions, which appear as dulling, iridescence, milky decomposition, etc.

cullet Glass fragments that are melted down and reused in the making of new glass.

engraving Not a precise term; usually connotes cutting when the design is fairly elaborate.

eye bead A bead decorated with applied or embedded circular motifs of a contrasting color.

findspot The exact place at which an object was excavated.

footring The foot of a vessel, usually formed by folding the bottom of the glass wall to a double thickness.

free-blown Formed by blowing and manipulating.

gatch Plaster floor.

gather A lump of soft glass taken from the furnace on the tip of the blowpipe and ready to be worked.

glasshouse A glass workshop or manufacturing center.

incised glass Glass decorated when cold by scratching or incising the surface with a special tool.

intermediate style A style of decoration with elements of both the linear style and the slant-cut style.

iridescence An effect of rainbowlike color on or under the surface of the glass, caused by the presence of a thin layer or layers of corrosion.

kick A concavity at the base of a vessel where it has been pushed in by a tool called a pontil.

kick-base A base with a kick.

Kufic An early Arabic script characterized by angularity and a straight horizontal median line.

lappet A flat hanging piece.

linear style A style of decoration in which cut lines against a plain background delineate vegetal or geometrical themes, abstractly treated.

luster painting The painting of glass or pottery with metal oxides, especially those of silver and copper, which become somewhat iridescent after firing.

marver A flat surface on which the glass gather is rolled to give it the desired shape.

millefiori glass Glass in which sliced sections of colored canes combined into varying patterns are embedded.

molar flask A type of small flask with four pointed feet that give it a toothlike shape.

mold blown Formed by blowing into a mold which is patterned to create a decorated surface.

palmette A plant or flowerlike motif with radiating petals.

pinching Decorating glass by impressing the soft surface with an instrument resembling a pair of tongs; sometimes called pincering.

pontil A metal rod attached to a glass object while it is soft in order to hold and manipulate it during the manufacturing process.

pontil mark A scar on the base of a vessel where the pontil was attached.

profiled rim A vessel rim that is not a simple edge; usually it is ridged because the thickness of the glass has been doubled at the edge to strengthen the vessel.

prunt A glob of glass applied for decorative purposes, usually to the wall of a vessel, and sometimes stamped with relief ornament or an inscription.

qanāt An underground system of water channels.

qiblah The direction toward Mecca in which worshipers face; the *qiblah* wall is usually marked by a prayer niche, or mihrab.

relief-cut A type of wheel-cut glass for which a large part of the glass is ground away, allowing the design to stand out in relief against the background.

scratch-decorated Incised.

segmental Curved shallowly like the segment of a sphere.

slag Waste substance produced in the making of glass or the smelting of metal.

slant-cut glass A style of wheel-cut glass in which the design motifs are delineated by cuts made on a slant. The design tends to occupy the entire field, leaving little or no ground.

snake-thread motif A decorative motif for which threads of glass are applied in serpentine shapes to the surface of a vessel.

spur A support or trivet on which pottery is placed for firing in the kiln.

stamping A technique of decorating glass while it is still soft by using a tonglike instrument carrying a design on one arm or by impressing a stamp with a countersunk pattern.

stratigraphy The determining of occupational levels and assigning of them to different stages or periods.

tepe A mound or hill.

waster An object that became misshapen, cracked, or otherwise flawed during the manufacturing process.

weathering Corrosion.

wheel-cutting A technique of decorating glass when it is cold by engraving, cutting, or grinding a pattern into the surface.

wick-holder A vertical tube to hold a wick or candle attached inside a vessel used as a lamp.

wire-wound A term describing beads made by winding soft glass around a bead mold or core.

zir-i-zamin An underground room or cellar used in hot weather.

Concordance

Objects are listed by accession number in The Metropolitan Museum of Art or the Iran Bastan Museum, followed by number in this catalogue. The objects that were discarded and those objects in the Iran Bastan Museum for which numbers are not available do not appear in this concordance.

Metropolitan Museum Number	Catalogue Number	Metropolitan Museum Number	Catalogue Number
37.40.7	115	40.170.58	36
37.40.8	100	40.170.59	198
37.40.28	107	40.170.60	16
37.40.34	188	40.170.61	172
37.40.35	187	40.170.62	112
38.40.195	240	40.170.63	82
38.40.196	59	40.170.64	177
38.40.197	33	40.170.65	86
38.40.229	127	40.170.66	45
38.40.230	98	40.170.70	93
38.40.231	83	40.170.71	102
38.40.232	81	40.170.72	71
38.40.241	67	40.170.73	101
38.40.259	106	40.170.74	52
38.40.260	123	40.170.75	49
38.40.297	104	40.170.129	225
39.40.42	202	40.170.130	11
39.40.43	217	40.170.131	164
39.40.44	218	40.170.132	242
39.40.45	128	40.170.134	9
39.40.101	228	40.170.135	1
39.40.126	105	40.170.137	14
39.40.129	76	40.170.138	206
39.40.130	118	40.170.175	233
39.40.131	77	40.170.179	37
39.40.143	178	40.170.180	192
40.170.55	223	40.170.181	193
40.170.56	89	40.170.226	204
40.170.57	42	40.170.260	244

Metropolitan Museum Number	Catalogue Number	Metropolitan Museum Number	Catalogue Number
40.170.414	app. 1 (2)	48.101.90p	252
40.170.415	app. 1 (1)	48.101.90q	265
40.170.445	144	48.101.90r	248
40.170.446	143	48.101.90s	258
40.170.447	145	48.101.90t	263
40.170.448	168	48.101.90u	261
40.170.449	176	48.101.90v(?)	264
40.170.450	57	48.101.90x	257
40.170.451	151	48.101.180a	266
40.170.675	163	48.101.180b	249
40.170.700	284	48.101.192	260
40.170.701a	285	48.101.192b	262
40.170.701b	286	48.101.192e	254
40.170.701c	290	48.101.209a	259
40.170.701d	291	48.101.209e	280
48.101.10	171	48.101.209f	281
48.101.18	78	48.101.209g	279
48.101.19	180	48.101.209h(?)	287
48.101.55	212	48.101.209i	277
48.101.56	32	48.101.218	288
48.101.57	140	48.101.235	276
48.101.58	110	48.101.258	124
48.101.59	235	48.101.259	119
48.101.60	133	48.101.260	159
48.101.61	211	48.101.261	184
48.101.79	255	48.101.262a–b	182
48.101.79b	251	48.101.263	226
48.101.84a	283	48.101.264	167
48.101.84b	289	48.101.265	135
48.101.84c	282	48.101.266	20
48.101.84d	278	48.101.267a–d	214
48.101.86a	269	48.101.268a–c	136
48.101.86b	270	48.101.269a–d	15
48.101.86c	271	48.101.270	170
48.101.86d	267	48.101.271	125
48.101.90a	274	48.101.272	236
48.101.90b	256	48.101.273a	195
48.101.90d	272	48.101.273b	196
48.101.90f	247	48.101.274	185
48.101.90i	268	48.101.275	230
48.101.90j	253	48.101.276	63
48.101.90k(?)	250	48.101.277a–c	197

Metropolitan Museum Number	Catalogue Number
48.101.278a–b	165
48.101.279	173
48.101.281a–c	27
48.101.282	186
48.101.283a–d	215
48.101.284	139
48.101.286a–c	80
48.101.287a–d	213
48.101.288	64
48.101.289	200
48.101.290	53
48.101.?	292
No number	208
No number	273
No number	275

Iran Bastan Museum Number	Catalogue Number
3234	120
3294	227
3943	219
3944	232
3955	169
3957	117
4807	160
8146	29
8246	241
20302	75
20304	60
20316	31
20325	109
20333	175
20358	73
20373	203
20377	43
20381	229
20436	174
20530	239
20535	162
20543	183
21256(?)	201
21259	116
21281	179
21417	62

Bibliography

ABBREVIATIONS

AMI	*Archäologische Mitteilungen aus Iran*
DAFI	*Cahiers de la Délégation Archéologique Française en Iran*
JARCE	*Journal of the American Research Center in Egypt*
JGS	*Journal of Glass Studies*

Abdul Khaliq, Hana'. "Glass Objects Newly Obtained by the Iraq Museum." *Sumer* 28 (1972), pp. 47–52.

———. *The Islamic Glass in the Iraqi Museums and Stores.* Ministry of Information, Directorate General of Antiquities. Baghdad, 1976.

———. "Al-Mada'en" (in Arabic). *Sumer* 44 (1985–86), pp. 111–38.

———. "Mumayyizāt al-zujāj al-ʿirāqī fī al-ʿaṣr al-islāmī" (Characteristics of Iraqi glass in the Islamic period). *Sumer* 29 (1973), pp. 207–20.

Abdurazakov, A. A. "Medieval Glasses from the Tashkent Oasis." *JGS* 11 (1969), pp. 31–36.

Abdurazakov, A. A., M. A. Bezborodov, and I. A. Zadneprovskii. *Steklodeliye Srednei Azii v drevnosti i Srednevekov'ye* (Glass-making in Central Asia in medieval times). Tashkent, 1963.

Adams, R. McC. "Tell Abū Sarīfa: A Sasanian–Islamic Ceramic Sequence from South Central Iraq." *Ars Orientalis* 8 (1970), pp. 87–119.

Allan, James W. "The Nishapur Metalwork: Cultural Interaction in Early Islamic Iran." In *Content and Context of Visual Arts in the Islamic World,* edited by Priscilla P. Soucek, pp. 1–11. Monographs on the Fine Arts: The College Art Association of America, 44. University Park, Pa., and London, 1988.

———. *Nishapur: Metalwork of the Early Islamic Period.* New York, 1982.

Amindzhanova, M. "Srednevekoviye steklyanniye sosudy iz muzeev Tashkenta i Samarkanda" (Medieval glass from the Tashkent and Samarkand museums). In *Istoriya Material'noi Kul'tury Samarkanda,* edited by V. A. Shishkin, vol. 3, pp. 87–100. Tashkent, 1962.

Ancient Bronzes, Ceramics and Seals: The Nasli M. Heeramaneck Collection of Ancient Near Eastern, Central Asiatic, and European Art. Exh. cat., Los Angeles County Museum of Art. Los Angeles, 1981.

Anderson, R. G. W. "Early Islamic Chemical Glass." *Chemistry in Britain* 19 (October 1983), pp. 822–23.

An Jiayao. "Dated Islamic Glass in China." *Bulletin of the Asia Institute,* n. s., 5 (1991), pp. 123–38.

———. *Early Chinese Glassware.* Translated by Matthew Henderson. The Oriental Ceramic Society, 12. London, [1987].

———. "On the Early Islamic Glasses Discovered in China in Recent Years" (in Chinese). *Kaogu* 12 (1990), pp. 1116–26.

Arne, T[ure] J[ohnsson]. *Excavations at Shah Tépé, Iran.* Stockholm, 1945.

Art from the World of Islam: Eighth–Eighteenth Century (Danish title: *Kunst fra Islams Verden 8.–18. århundrede*). Exh. cat., Louisiana Museum. Published in *Louisiana Revy,* 27, no. 3. Humlebaek, Denmark, 1987. In Danish and English editions.

The Arts of Islam. Exh. cat., Hayward Gallery (The Arts Council of Great Britain). London, 1976.

The Arts of Islam: Masterpieces from The Metropolitan Museum of Art, New York (German title: *Islamische Kunst: Meisterwerke aus dem Metropolitan Museum of Art, New York*). Exh. cat., Staatliche Museen Preussischer Kulturbesitz. Berlin, 1981. In German and English.

Atıl, Esin, W. T. Chase, and Paul Jett. *Islamic Metalwork in the Freer Gallery of Art.* Exh. cat. Washington, D.C., 1985.

Auth, Susan H. *Ancient Glass at the Newark Museum, from the Eugene Schaefer Collection of Antiquities.* Exh. cat. Newark, N.J., 1976.

Ayers, John. "Oriental Art in the Victoria and Albert Museum." In *The Victoria and Albert Museum*, pp. 258–382. London, 1983.

Baer, Eva. "An Islamic Inkwell in The Metropolitan Museum of Art." In *Islamic Art in The Metropolitan Museum of Art,* edited by Richard Ettinghausen, pp. 199–211. New York, 1972.

———. *Metalwork in Medieval Islamic Art.* Albany, 1983.

Barnes, I. Lynus, R. H. Brill, Emile C. Deal, and G. V. Piercy, "Lead Isotope Studies of Some of the Finds from the Serce Liman Shipwreck." In *Proceedings of the 24th International Archaeometry Symposium,* edited by Jacqueline S. Olin and M. James Blackman, pp. 1–12. Washington, D.C., 1986.

Bass, George F. "The Nature of the Serçe Limani Glass." *Journal of Glass Studies* 26 (1984), pp. 64–69.

Baumgartner, Erwin, and Ingeborg Krueger. *Phönix aus Sand und Asche: Glas des Mittelalters.* Exh. cat., Rheinisches Landesmuseum, Bonn, and Historisches Museum, Basel. Munich, 1988.

Beck, Horace C. "Classification and Nomenclature of Beads and Pendants." *Archaeologia* 77 (1927 [1928]), pp. 1–76.

Billeter, Erika. *Glas aus der Sammlung des Kunstgewerbemuseums Zürich.* Exh. cat., Museum Bellerive. Zurich, 1969.

Bivar, A. D[avid] H. *Catalogue of the Western Asiatic Seals in the British Museum: Stamp Seals, II: The Sassanian Dynasty.* London, 1969.

———. "Ghubayrā 1976." *AMI* 13 (1980), pp. 7–19.

Bivar, A. D[avid] H., and G[eza] Fehérvári. "Excavations at Ghubayrā, 1971: First Interim Report." *Journal of the Royal Asiatic Society,* 1974, pp. 107–41.

———. "Ghubayrā," in "Survey of Excavations." *Iran* 10 (1972), pp. 168–69.

———. "Ghubayrā," in "Survey of Excavations." *Iran* 11 (1973), pp. 194–95.

———. "Qobeyrā 1974. Advance Report on the Third Season." In *Proceedings of the IIIrd Annual Symposium on Archaeological Research in Iran,* edited by F. Bagherzadeh, pp. 255–62. Tehran, 1975.

Blair, Dorothy. *A History of Glass in Japan.* Corning, N.Y., 1973.

Bosworth, C[lifford] Edmund. "Capital Cities, II: In Islamic Times." In *Encyclopedia Iranica*, vol. 4, pp. 770–74. London and New York, 1990.

———. *The Ghaznavids: Their Empire in Afghanistan and Eastern Iran, 994–1040.* Edinburgh, 1963.

Bothmer, Hans-Caspar Graf von. "Architekturbilder im Koran: Eine Prachthandschrift der Umayyadenzeit aus dem Yemen." *Pantheon* 45 (1987), pp. 4–20.

Boucharlat, Rémy, and Olivier Lecomte. *Fouilles de Tureng Tepe.* Vol. 1, *Les Périodes sassanides et islamiques.* General editor Jean Deshayes. Paris, 1987.

Brill, R. H. "Chemical Studies of Islamic Luster Glass." In *Scientific Methods in Medieval Archaeology,* edited by Rainer Berger, pp. 351–77. UCLA Center for Medieval and Renaissance Studies, Contributions, 4. Berkeley, Calif., 1970.

———. "Glass and Glassmaking in Ancient China, and Some Other Things from Other Places." Dominick Labino Fund Lecture, *Journal* [of The Glass Art Society], 1993, pp. 56–69.

———. "Scientific Investigations of the Jalame Glass and Related Finds." In *Excavations at Jalame: Site of a Glass Factory in Late Roman Palestine*, edited by Gladys Davidson Weinberg, pp. 257–94. Columbia, Mo., 1988.

Brill, R. H., and P. M. Fenn. "Some Thoughts on the Famen Temple Glass Finds." In *Proceedings of the First International Symposium on Famensi Culture, September 10, 1990: Fufeng County, Shaanxi Province*, pp. 254–58. Xian, 1992.

Brill, R. H., Dan Barag, A. Leo Oppenheim. "The Chemical Interpretation of the Texts." In *Glass and Glassmaking in Ancient Mesopotamia: An Edition of the Cuneiform Texts Which Contain Instructions for Glassmakers with a Catalogue of Surviving Objects*, edited by A. Leo Oppenheim, Robert H. Brill, Dan Barag, and Axel von Saldern, pp. 105–28. Corning Museum of Glass Monographs, 3. New York and London, 1970. Reprint, 1988.

Brosh, N. "Glass Window Fragments from Khirbet al-Mafjar." In *Annales du 11e Congrès de l'Association Internationale pour l'Histoire du Verre, Bâle, 29 août–3 septembre 1988,* pp. 247–56. Amsterdam, 1990.

Brunner, Christopher J. *Sasanian Stamp Seals in The Metropolitan Museum of Art.* New York, 1978.

Buckley, Wilfred. *The Art of Glass: Illustrated from the Wilfred Buckley Collection in the Victoria and Albert Museum, London.* London, 1939.

———. "Two Glass Vessels from Persia." *Burlington Magazine* 67 (August 1935), pp. 66–71.

Bulliet, Richard W. "Medieval Nishapur: A Topographic and Demographic Reconstruction." *Studia Iranica* 5 (1976), pp. 67–89.

———. *The Patricians of Nishapur: A Study in Medieval Islamic Social History.* Cambridge, Mass., 1972.

Charleston, R[obert] J. "Glass." In *The Arts of Persia,* edited by R. W. Ferrier, pp. 295–305. New Haven, 1989.

———. "A Group of Near Eastern Glasses." *Burlington Magazine* 81 (September 1942), pp. 212–18.

———. *Masterpieces of Glass: A World History from the Corning Museum of Glass.* With David B. Whitehouse and Susanne K. Frantz. Corning, N. Y., 1980. Expanded edition, 1990.

———. "Wheel-Engraving and -Cutting: Some Early Equipment. I: Engraving." *JGS* 6 (1964), pp. 83–100.

Clairmont, Christoph W. *Benaki Museum: Catalogue of Ancient and Islamic Glass: Based on the Notes of C. J. Lamm.* Athens, 1977.

———. *The Glass Vessels.* Part 5 of *The Excavations at Dura-Europos: Final Report IV.* New Haven, 1963.

———. "Some Islamic Glass in the Metropolitan Museum." In *Islamic Art in The Metropolitan Museum of Art,* edited by Richard Ettinghausen, pp. 141–52. New York, 1972.

Crowfoot, Grace M., and D. B. Harden. "Early Byzantine and Later Glass Lamps." *The Journal of Egyptian Archaeology* 17 (1931), pp. 196–208.

Curatola, Giovanni, ed. *Eredita dell'Islam: Arte Islamica in Italia.* Exh. cat., Palazzo Ducale, Venice. Milan, 1993.

Davidson, Gladys R. *The Minor Objects.* Vol. 12 of *Corinth: Results of Excavations Conducted by the American School of Classical Studies at Athens.* Princeton, 1952.

Deshayes, J. "Rapport préliminaire sur le neuvième campagne de fouille à Tureng Tépé." *Iran* 11 (1971), pp. 141–52.

Doorninck, F. H. van. "The Serçe Limanı Shipwreck: An 11th-Century Cargo of Fatimid Glassware Cullet for Byzantine Glassmakers." In *1st International Anatolian Glass Symposium, April 26th–27th, 1988,* pp. 58–63. Istanbul, 1990.

3000 [Dreitausend] Jahre Glaskunst: Von der Antike bis zum Jugendstil. Exh. cat., Kunstmuseum Luzern. 1981.

Edwards, P. C., et al. "Preliminary Report on the University of Sydney's Tenth Season of Excavations at Pella (Ṭabaqat Faḥl) in 1988." *Annual of the Department of Antiquities (Amman, Jordan)* 34 (1990), pp. 57–93.

Erdmann, Hanna. *Iranische Kunst in deutschen Museen.* Wiesbaden, 1967. In German and Persian.

Erdmann, Kurt. "Die fatimidischen Bergkristallkannen." In *Forschungen zur Kunstgeschichte und christlichen Archäologie,* vol. 2, pp. 189–205. Baden-Baden, 1953.

———. "Neuerworbene Gläser der islamischen Abteilung." *Berichte aus den ehem. Preussischen Kunstsammlungen,* n. s., 11 (1961), pp. 31–41.

———. "Noch einmal zur Datierung der Berliner Pegasus-Schale." *Archäologischer Anzeiger,* incorporated in *Jahrbuch des Deutschen Archäologischen Instituts* 68 (1953), cols. 136–41.

———. "Opere islamiche." With contributions by A. Grabar and H. R. Hahnloser. In *Il Tesoro e il Museo,* pp. 101–27, vol. 2 of *Il Tesoro di San Marco,* edited by H. R. Hahnloser. Florence, 1971.

———. "Zur Datierung der Berliner Pegasus-Schale." *Archäologischer Anzeiger,* incorporated in *Jahrbuch des Deutschen Archäologischen Instituts* 65/66 (1950–1951), cols. 115–31.

Ettinghausen, Richard. "The 'Beveled Style' in the Post-Samarra Period." In *Archaeologica Orientalia in Memoriam Ernst Herzfeld,* edited by George C. Miles, pp. 72–83. Locust Valley, N.Y., 1952.

———. "An Early Islamic Glass-Making Center." *Record of the Museum of Historic Art, Princeton University* 1, no. 2 (Fall 1942), pp. 4–7.

———. "The Flowering of Seljuq Art." *Metropolitan Museum Journal* 3 (1970), pp. 113–31.

Ettinghausen, Richard, and Oleg Grabar. *The Art and Architecture of Islam: 650–1250.* The Pelican History of Art. Harmondsworth, Middlesex, England, 1987.

Excavations at Samarra, 1936–1939 (Arabic title: *Ḥafriyāt Sāmarrā, 1936–1939*). Part 1, *Architecture and Mural Decoration.* Part 2, *Objects.* ʿIrāq, Directorate of Antiquities. Baghdad, 1940. In Arabic and English.

Ezzy, Waffiya. See Pinder-Wilson and Ezzy.

Fenn, P. M., Shi Meiguang, and R. H. Brill. "Addendum to Chapter 4." In *Scientific Research in Early Chinese Glass,* edited by Robert H. Brill and John H. Martin, pp. 59–64. Corning, N.Y., 1991.

Ferrier, R. W., ed. *The Arts of Persia.* New Haven and London, 1989.

Folsach, Kjeld von. *Islamic Art: The David Collection.* Copenhagen, 1990.

Fremersdorf, Fritz. *Antikes, islamisches und mittelalterliches Glas: Sowie kleinere Arbeiten aus Stein, Gagat und verwandten Stoffen in den Vatikanischen Sammlungen Roms (Museo Sacro, Museo Profano, Museo Egizio, Antiquarum Romanum).* Catalogo del Museo Sacro della Biblioteca Apostolica Vaticana, vol. 5. Vatican City, 1975.

Frye, Richard N. "The Sāmānids." In *The Period from the Arab Invasion to the Saljuqs,* edited by R. N. Frye, pp. 136–61, vol. 4 of *The Cambridge History of*

Iran, edited by William B. Fisher. Cambridge, 1975.

Führer durch das Museum Folkwang, Essen. Recklinghausen, 1964.

Fukai, Shinji. *Persian Glass.* Translated by Edna B. Crawford, with photographs by Bin Takahashi. New York, 1977.

Gabrieli, F[rancesco], and U[mberto] Scerrato. *Gli Arabi in Italia: Cultura, contatti e tradizioni.* Milan, 1979.

Gam, Tine. "Experiments in Glass." In *Annales du 12e Congrès de l'Association Internationale pour l'Histoire du Verre, Vienne–Wien, 26–31 août 1991,* pp. 261–70. Amsterdam, 1993.

Genito, B. *Vetri iranici.* Museo Nazionale d'Arte Orientale. Rome, 1977.

Ghouchani, A[bdullah]. *Inscriptions on Nishabur Pottery.* Introduction by M. Y. Kiani. Tehran, 1986. In English and Persian.

Glass from the Ancient World: The Ray Winfield Smith Collection. Exh. cat., The Corning Museum of Glass. Corning, N.Y., 1957.

Göbl, Robert. *Der sāsānidische Siegelkanon.* Handbücher der Mittelasiatischen Numismatik, 4. Brunswick, Germany, 1973.

Goldstein, Sidney M. "The New Corning Museum of Glass." *Archaeology* 33, no. 3 (May–June 1980), pp. 52–55.

Goldstein, Sidney M., et al. *Cameo Glass: Masterpieces from 2000 Years of Glassmaking.* Exh. cat., The Corning Museum of Glass. Corning, N.Y., 1982.

Golombek, Lisa. Review of Charles K. Wilkinson, *Nishapur: Some Early Islamic Buildings and Their Decoration. Iranian Studies* 22, no. 1 (1988–89), pp. 88–90.

Grabar, André. "La Verrerie d'art byzantine au moyen âge." *Monuments et Mémoires,* vol. 57, pp. 89–127. Published by the Académie des Inscriptions et Belles-Lettres, Fondation Eugène Piot. Paris, 1971.

Grabar, A[ndré]. "Opere bizantine." With contributions by A. Frolow, H. R. Hahnloser, G. Mariacher, W. F. Volbach, M. Theocharis. In *Il Tesoro e il Museo,* pp. 13–97, vol. 2 of *Il Tesoro di San Marco,* edited by H. R. Hahnloser. Florence, 1971.

Grabar, O[leg]. "Notes on the Decorative Composition of a Bowl from Northeastern Iran." In *Islamic Art in The Metropolitan Museum of Art,* edited by Richard Ettinghausen, pp. 91–98. New York, 1972.

———. "The Visual Arts." In *The Period from the Arab Invasion to the Saljuqs,* edited by R. N. Frye, pp. 329–63, vol. 4 of *The Cambridge History of Iran,* edited by William B. Fisher. Cambridge, 1975.

Grohmann, Adolf. *Arabische Paläographie.* 2 vols. Forschungen zur Islamischen Philologie und Kulturgeschichte, 2. Vienna, 1967–1971.

Gulyamova, Erkina. "Steklo s gorodishcha Khul'buk X–XIIvv." (Glass from the citadel of Khul'buk [Khutta] 10th–12th centuries). *Izvestiya Akademii Nauk Tazdzhikskoi SSR* 1 (24), pp. 11–64. Stalinabad (now Dushambe), 1961.

Harden, D[onald] B. "Glass." In *Excavations at Nessana (Auja Hafir, Palestine),* edited by H. Dunscombe Colt, vol. 1, pp. 76–91. Princeton, 1950–62.

———. *Glass of the Caesars.* Exh. cat., The Corning Museum of Glass, Corning, N.Y., The British Museum, London, and the Römisch-Germanisches Museum, Cologne. Milan, 1987.

———. *Roman Glass from Karanis: Found by the University of Michigan Archaeological Expedition in Egypt, 1924–29.* University of Michigan Studies, Humanistic Series, 41. Ann Arbor, 1936.

Harden, Donald B., K. S. Painter, R. H. Pinder-Wilson, and Hugh Tait. *Masterpieces of Glass.* Exh. cat., The British Museum. London, 1968.

Hardy-Guilbert, Claire. "Les Niveaux islamiques du secteur Apadana—Ville Royale Suse 1976–1978." *DAFI* 14 (1984), pp. 121–209.

Harper, Prudence Oliver. *The Royal Hunter: Art of the Sasanian Empire.* Exh. cat., Asian House Gallery. New York, 1978.

———. Also see Oliver, Prudence.

Hassan, Ahmad Y. al-, and Donald R. Hill. *Islamic Technology: An Illustrated History.* Cambridge and Paris, 1986.

Hasson, Rachel. *Early Islamic Glass.* L. A. Mayer Memorial Institute for Islamic Art. Jerusalem, 1979.

———. *Early Islamic Jewellery.* Exh. cat., L. A. Mayer Memorial Institute for Islamic Art. Jerusalem, 1987.

Hauser, Walter, Joseph M. Upton, and Charles K. Wilkinson. "The Irānian Expedition, 1937." *Bulletin of The Metropolitan Museum of Art* 33, no. 11 (1938), pp. 3–23.

Hauser, Walter, and Charles K. Wilkinson. "The Museum's Excavations at Nīshāpūr." *Bulletin of The*

Metropolitan Museum of Art 37, no. 4 (1942), pp. 83–119.

Heaton, Noël. "The Origin and Use of Silver Stain." *Journal of the British Society of Master Glass-Painters* 10, no. 1 (1948), pp. 9–16.

Hobson, R. L. "On Chinese Cloisonné Enamel—I." *Burlington Magazine* 21 (June 1912), pp. 137–42.

Honey, W[illiam] B. *Glass: A Handbook for the Study of Glass Vessels of all Periods and Countries & a Guide to the Museum Collection.* Victoria and Albert Museum. London, 1946.

Important Islamic, Indian, Himalayan and South-East Asian Art. Sale cat. London: Christie's, April 24th, 1990.

Isings, Clasina. *Roman Glass from Dated Finds.* Archaeologica Traiectina, 2. Groningen and Djakarta, 1957.

Islam: Konst och Kultur. Exh. cat., Statens Historiska Museum. Stockholm, 1985. In Swedish and English.

Islamic Works of Art, Carpets and Textiles. Sale cat. London: Sotheby's, October 15–16, 1985.

Islamische Kunst: Verborgene Schätze Ausstellung des Museums für Islamische Kunst 1986–1987. Exh. cat. Berlin, 1986.

Janpoladian, H. M. *The Medieval Glassware of Dvin.* The Archaeological Monuments and Specimens of Armenia, 7. Yerevan, 1974. In Armenian, Russian, and English.

Janpoladian, H. M., and A. A. Kalantarian. *Trade Relations of Medieval Armenia in the VIth–XIIIth Centuries (According to Glasswork Data).* The Archaeological Monuments and Specimens of Armenia, 14. Yerevan, 1988. In Armenian and Russian.

Jenkins, Marilyn. "Islamic Glass: A Brief History." *The Metropolitan Museum of Art Bulletin,* n. s., 44, no. 2 (Fall 1986), pp. 3–55.

———, ed. *Islamic Art in the Kuwait National Museum: The al-Sabah Collection.* Exh. cat. London, 1983.

Jenkins, Marilyn, and Manuel Keene. *Islamic Jewelry in The Metropolitan Museum of Art.* New York, 1982.

Keene, Manuel, and Ghada Hijjawi Qaddumi. *Selected Recent Acquisitions: 1404 A.H.–1984 A.D.* Exh. cat., Dar al-Athar al-Ishamiyah/Kuwait National Museum. Kuwait City, [1984]. In Arabic and English.

Kervran, Monique. "Les Niveaux islamiques du secteur oriental du tépé de l'Apadana." With Martine Azarnoush and Claire Hardy. *DAFI* 4 (1974), pp. 21–41.

———. "Les Niveaux islamiques du secteur oriental du tépé de l'Apadana, II: Le Matérial céramique." *DAFI* 7 (1977), pp. 75–161.

———. "Les Niveaux islamiques du secteur oriental du tépé de l'Apadana, III: Les Objets en verre, en pierre et en métal." *DAFI* 14 (1984), pp. 211–35.

———. "Une Sucrerie d'époque islamique sur la rive droite du Chaour à Suse, II: Le Matériel archéologique." *DAFI* 10 (1979), pp. 177–237.

Kevorkian, Anne-Marie, and G. Loudmer. *Verres antiques et de l'Islam.* Sale cat. Paris: Hôtel Drouot, June 3–4, 1985.

Khairy, Nabil I. "Ink-wells of the Roman Period from Jordan." *Levant* 12 (1980), pp. 155–62.

Kiani, M. Y. *The Islamic City of Gurgan. AMI,* suppl. vol. 11. Berlin, 1984.

Kitson-Mimmack, Joy Joan. "The Glass Beakers of the Eleventh-Century Serçe Limanı Shipwreck—A Preliminary Study." M.A. thesis, Texas A & M University Graduate College, 1988.

Klein, Adalbert, and Johanna Zick-Nissen. *Islamische Keramik: Hetjens-Museum, Düsseldorf, in Zusammenarbeit mit dem Museum für Islamische Kunst, Berlin.* Exh. cat., Hetjens-Museum. Düsseldorf, 1973.

Kordmahini, Helen A. *Glass from the Bazargan Collection.* Tehran, 1988. In English and Persian.

Kröger, Jens. *Glas.* Vol. 1 of *Islamische Kunst,* edited by Klaus Brisch. Mainz, 1984.

———. *Parthisches, Sasanidisches und Islamisches Glas: Die Glasfunde von Ktesiphon (Iraq) nach den Ausgrabungen der Ktesiphon-Expedition 1928–29 und 1931–32.* Forthcoming.

———. *Sasanidischer Stuckdekor.* Baghdader Forschungen, 5. Mainz am Rhein, 1982.

Kubiak, Wladyslaw, and George T. Scanlon. "Fusṭāṭ Expedition: Preliminary Report, 1971: Part II." *JARCE* 17 (1980), pp. 77–96.

Kuhn, Dieter, ed. *Chinas Goldenes Zeitalter: Die Tang-Dynastie (618–907 n. Chr.) und das kulturelle Erbe der Seidenstrasse.* Exh. cat., Museum für Kunst und Kulturgeschichte der Stadt Dortmund. Heidelberg, 1993.

Kühnel, Ernst. "Die ʿAbbāsidischen Lüsterfayencen." *Ars Islamica* 1 (1934), pp. 149–159.

Kunstschätze aus Iran von der prähistorischen bis zur islamischen Zeit. Exh. cat., Österreichisches Museum für Angewandte Kunst. Vienna, 1963.

Lacam, Jean. "Contribution à l'étude de la verrerie musulmane, VIII^e^, IX^e^ et X^e^ siècle." *Cahiers de la Céramique* 21 (1961), pp. 14–30.

Lamm, C[arl] J[ohan]. "Glass and Hard Stone Vessels." In *A Survey of Persian Art*, edited by Arthur Upham Pope, vol. 3, pp. 2592–2606; vol. 6, pls. 1439ff. London and New York, 1939.

———. *Glass from Iran in the National Museum, Stockholm.* Stockholm [and London], 1935.

———. *Das Glas von Samarra.* Vol. 4 of *Die Ausgrabungen von Samarra.* Forschungen zur Islamischen Kunst, 2. Berlin, 1928.

———. *Mittelalterliche Gläser und Steinschnittarbeiten aus dem Nahen Osten.* 2 vols. Forschungen zur Islamischen Kunst, 5. Berlin, 1929–30.

———. *Oriental Glass of Mediaeval Date Found in Sweden and the Early History of Lustre-Painting.* Stockholm, 1941.

———. "Les Verres trouvés à Suse." *Syria* 12 (1931), pp. 358–67.

Lane, Arthur. *Early Islamic Pottery: Mesopotamia, Egypt, Persia.* London, 1958.

———. "Medieval Finds at Al Mina in North Syria." *Archaeologia* 87 (1938), pp. 19–78.

Lentz, Thomas W., and Glenn D. Lowry. *Timur and the Princely Vision: Persian Art and Culture in the Fifteenth Century.* Exh. cat., Arthur M. Sackler Gallery of the Smithsonian Institution, Washington, D. C., and Los Angeles County Museum of Art. Los Angeles, 1989.

Leth, A[ndré]. *Davids Samling: Islamisk Kunst* (The David Collection: Islamic Art). Exh. cat. Copenhagen, 1975. In Danish with English captions.

———. "Tidlig islamisk kunst." In *C. L. Davids Samling: Fjerde del Jubilaeumsskrift 1945–70*, pp. 87–157. Copenhagen, 1970.

Levey, Martin. *Mediaeval Arabic Bookmaking and Its Relation to Early Chemistry and Pharmacology.* Transactions of the American Philosophical Society, n. s., 52, part 4. Philadelphia, 1962.

Lowry, Glenn D. "On the Gold Jug Inscribed to Abu Mansur Al-Amir Bakhtiyar ibn Mu^c^izz al-Dawla in the Freer Gallery of Art." *Ars Orientalis* 19 (1989), pp. 103–15.

Lukens [Swietochowski], Marie G. "Medieval Islamic Glass." *Bulletin of The Metropolitan Museum of Art* 23, no. 6 (1965), pp. 198–208.

Marçais, Georges, and Louis Poinssot. *Objets kairouanais IX^e^ au XIII^e^ siècle: Reliures, verreries, cuivres et bronzes, bijoux.* 2 vols. Tunis, 1952.

Marschak, Boris. *Silberschätze des Orients: Metallkunst des 3.–13. Jahrhunderts und ihre Kontinuität.* Leipzig, 1986.

Mayer, L. A. "Islamic Glassmakers and Their Works." *Israel Exploration Journal* 4 (1954), pp. 262–65.

McEwan, Calvin W., et al. *Soundings at Tell Fakhariyah.* Oriental Institute Publications, 79. Chicago, 1958.

Megaw, A.H.S. "More Gilt and Enameled Glass from Cyprus." *JGS* 10 (1968), pp. 88–104.

Melikian-Chirvani, Assadullah Souren, ed. *Islamic Metalwork from the Iranian World, Eighth–Eighteenth Centuries.* Exh. cat., Victoria and Albert Museum. London, 1982.

Melville, Charles. "Earthquakes in the History of Nishapur." *Iran* 18 (1980), pp. 103–20.

Miles, George C., ed. *Archaeologica Orientalia in Memoriam Ernst Herzfeld.* Locust Valley, N. Y., 1952.

Morgan, P., and J. Leatherby. "Excavated Ceramics from Sirjan." In *Syria and Iran: Three Studies in Medieval Ceramics*, edited by James Allan and Caroline Roberts, pp. 23–172. Oxford Studies in Islamic Art, 4. Oxford, 1987.

Morton, A. H. *A Catalogue of Early Islamic Glass Stamps in The British Museum.* London, 1985.

Nasr, Seyyed Hossein. *Islamic Science: An Illustrated Study.* [London?], 1976.

Naumann, Rudolf, and Elizabeth Naumann. *Takht-i Suleiman: Ausgrabung des Deutschen Archäologischen Instituts in Iran.* Ausstellungskataloge der Prähistorischen Staatssammlung, 3. Munich, 1976.

Negro Ponzi, Mariamaddalena. "Glassware from Abu Skhair (Central Iraq)." *Mesopotamia* 7 (1972), pp. 215–37.

———. "Glassware from Choche (Central Mesopotamia)." In *Arabie orientale, Mésopotamie et Iran méridional de l'âge du fer au début de la période islamique*, edited by Rémy Boucharlat and Jean-François Salles, pp. 33–40. Paris, 1984. In French and English.

———. "Islamic Glassware from Seleucia." *Mesopotamia* 5–6 (1970–71), pp. 67–104.

———. "Late Sasanian Glassware from Tell Baruda." *Mesopotamia* 22 (1987), pp. 265–75.

———. "Sasanian Glassware from Tell Mahuz

(North Mesopotamia)." *Mesopotamia* 3–4 (1968–69), pp. 293–384.

Northedge, Alastair. "Creswell, Herzfeld, and Samarra." *Muqarnas* 8 (1991), pp. 74–93.

———. "Planning Sāmarrā': A Report for 1983–4." *Iraq* 47 (1985), pp. 109–28.

Ohm, A[nnaliese], ed. *Europäisches und aussereuropäisches Glas.* Exh. cat., Museum für Kunsthandwerk, Frankfurt am Main. 1973.

———. *3000 Jahre Glas aus Privatsammlung Frankfurt am Main.* Exh. cat., Waldmuseum Zwiesel and Ruhrlandmuseum, Essen. 1974.

Oliver [Harper], Prudence. "Islamic Relief Cut Glass: A Suggested Chronology." *JGS* 3 (1961), pp. 9–29.

Orbeli, Iosif A., and Kamilla V. Trever. *Sasanidskii metall: khudozhestvennye predmety iz zolota, serebra i bronzy* (French title: *Orfèvrerie sasanide: Objets en or, argent et bronze*). Publication of III Congrès International d'Art et d'Archéologie Iraniens (Leningrad). Moscow and Leningrad, 1935. In Russian and French.

Pal, P[ratapaditya]. *Islamic Art: The Nasli M. Heeramaneck Collection, Gift of Joan Palevsky.* Exh. cat., Los Angeles County Museum of Art. 1973.

Pinder-Wilson, Ralph H. "Cut-Glass Vessels from Persia and Mesopotamia." *British Museum Quarterly* 27 (1963), pp. 33–39.

———. "Glass in Asia during the T'ang Period." In *Pottery and Metalwork in T'ang China: Their Chronology and External Relations,* edited by William Wilson, pp. 68–77. Colloquies on Art and Archaeology in Asia, 1. London, 1970.

———. "The Islamic Lands and China." In Hugh Tait, ed., *Glass, 5000 Years,* pp. 112–38. New York and London, 1991.

Pinder-Wilson, Ralph, and Waffiya Ezzy. "Glass." Introduction by Pinder-Wilson (pp. 131–35) and catalogue by Ezzy (pp. 136–46). In *The Arts of Islam.* Exh. cat., Hayward Gallery (The Arts Council of Great Britain). London, 1976.

Pinder-Wilson, R. H., and George T. Scanlon. "Glass Finds from Fustat: 1964–1971." *JGS* 15 (1973), pp. 12–30.

———. "Glass Finds from Fustat: 1972–1980." *JGS* 29 (1987), pp. 60–71.

Platz-Horster, G[ertrud]. *Antike Gläser.* Exh. cat., Antikenmuseum Berlin. Berlin, 1976.

Pope, Arthur Upham. "More about Persian Glass." *Apollo* 13 (1931), pp. 10–12.

———. "Persian Glass." *Apollo* 12 (1930), pp. 391–5.

Pope, Arthur Upham, ed. *A Survey of Persian Art from Prehistoric Times to the Present.* With Phyllis Ackerman, assistant ed. 6 vols. Oxford, 1938–1939. New edition. 15 vols. Tokyo and Oxford, 1964–77.

Puttrich-Reignard, Oswin Hans-Wolf. *Die Glasfunde von Ktesiphon.* Kiel, 1934.

Qaddumi, Ghada Hijjawi. *Variety in Unity: A Special Exhibition on the Occasion of the Fifth Islamic Summit in Kuwait.* Exh. cat., Dar al-Athar al-Islamiyyah/Kuwait National Museum. Kuwait City, 1987.

Raby, Julian. "Looking for Silver in Clay: A New Perspective on Sāmānid Ceramics." In *Pots and Pans: A Colloquium on Precious Metals and Ceramics in the Muslim, Chinese, and Greco-Roman World,* edited by Michael Vickers, pp. 179–203. Oxford Studies in Islamic Art, 3. Oxford, 1986.

Rackham, Bernard. "A Glass Beaker from Persia in the Victoria and Albert Museum." *Artibus Asiae* 4 (1926), pp. 307–8.

Raeuber, Alexandra. *Islamische Schönschrift: Sonderausstellung im "Haus zu Kiel."* Exh. cat., Museum Rietberg. Zurich, 1979.

"Recent Important Acquisitions Made by Public and Private Collections in the United States and Abroad." *JGS* 4 (1962), pp. 139–49; 7 (1965), pp. 120–33; 8 (1966), pp. 128–40; 10 (1968), pp. 180–90; 11 (1969), pp. 109–21; 13 (1971), pp. 134–47; 24 (1982), pp. 87–114.

Redman, Charles L. *Qsar es-Seghir: An Archaeological View of Medieval Life.* New York, 1986.

Rice, D. S. "Early Signed Islamic Glass." *Journal of the Royal Asiatic Society,* 1958, pp. 8–16.

Rice, David Talbot. *Islamic Art.* New York and London, 1965.

Ricke, Helmut. "Neue Räume—neue Gläser: Die Sammlung des Kunstmuseums Düsseldorf nach der Wiedereröffnung." *Kunst und Antiquitäten* 4 (1985), pp. 44–53.

Rosen-Ayalon, Myriam. *La Poterie islamique.* Mission de Susiane, Ville Royale de Suse, no. 4. Mémoires de la Délégation Archéologique Française en Iran, 50. Paris, 1974.

Saldern, Axel von. "Achaemenid and Sassanian Cut Glass." *Ars Orientalis* 5 (1963), pp. 7–16.

———. *Ancient and Byzantine Glass from Sardis.* Archaeological Exploration of Sardis, 6. Cambridge, Mass., and London, 1980.
———. *Ancient Glass in the Museum of Fine Arts.* Exh. cat. Boston, 1968. In German and English.
———. "Ein gläserner Schlangenkorb in Hamburg." *Festschrift für Peter Wilhelm Meister zum 65. Geburtstag am 16. Mai 1974,* edited by Annaliese Ohm and Horst Reber, pp. 56–61. Hamburg, 1975.
———. *Glassammlung Hentrich: Antike und Islam. Kataloge des Kunstmuseums Düsseldorf, Glas,* vol. 1, 3. Düsseldorf, 1974.
———. *Glas von der Antike bis zum Jugendstil: Sammlung Hans Cohn* (English title: *Glass 500 B.C. to A.D. 1900: The Hans Cohn Collection, Los Angeles, California*). Exh. cat., University of California, Los Angeles, Museum für Kunst und Gewerbe, Hamburg, and Israel Museum, Jerusalem. Los Angeles and Mainz am Rhein, 1980. In English and German.
———. "An Islamic Carved Glass Cup in the Corning Museum of Glass." *Artibus Asiae* 18 (1955), pp. 257–70.
———. "Sassanidische und islamische Gläser in Düsseldorf und Hamburg." *Jahrbuch der Hamburger Kunstsammlungen* 13 (1968), pp. 33–62.
———. "The So-called Byzantine Glass in the Treasury of San Marco." In *Annales du 4e Congrès International d'Étude Historique du Verre (Ravenne et Venise),* pp. 124–32. Liège, 1967. In French, German, and English.
———, et al. *Gläser der Antike: Sammlung Erwin Oppenländer.* Exh. cat., Museum für Kunst und Gewerbe, Hamburg. Mainz am Rhein, 1974.

Sarre, F[riedrich P. T.]. *Die Keramik von Samarra unter Mitwirkung von Ernst Herzfeld.* Vol. 2 of *Die Ausgrabungen von Samarra.* Forschungen zur Islamischen Kunst, 2. Berlin, 1925.

Sayre, Edward V., and Ray W. Smith. "Compositional Categories of Ancient Glass." *Science* 133, no. 3467 (June 9, 1961), pp. 1824–26.

Scanlon, George T. "Fusṭāṭ Expedition: Preliminary Report 1965, Part I." *JARCE* 5 (1966), pp. 83–112.
———. "Fusṭāṭ Expedition: Preliminary Report 1965, Part II." *JARCE* 6 (1967), pp. 65–86.
———. "Fusṭāṭ Expedition: Preliminary Report 1968, Part I." *JARCE* 11 (1974), pp. 81–91. See also Kubiak and Scanlon.
———. "A Note on Fāṭimid–Saljūq Trade." In *Islamic Civilisation, 950–1150: A Colloquium published under the auspices of The Near Eastern History Group, Oxford [and] The Near East Center, University of Pennsylvania,* edited by Donald S. Richards, pp. 265–74. Oxford, 1973.

Schlosser, Ignaz. *Das alte Glas: Ein Handbuch für Sammler und Liebhaber.* 3d ed. Bibliothek für Kunst- und Antiquitäten-Freunde, 36. Brunswick, Germany, 1977.

Schmidt, E[rich] F. "The Persian Expedition." *University Museum Bulletin* (Philadelphia) 5, no. 5 (March 1935), pp. 41–49.
———. *The Treasury of Persepolis and Other Discoveries in the Homeland of the Achaemenians.* Oriental Institute Communications, 21. Chicago, 1939.

Schmidt, Robert. *Das Glas: Handbücher der königlichen Museen zu Berlin, Kunstgewerbe-Museum.* 2d ed. Berlin, 1922.
———. "Die Hedwigsgläser und die verwandten fatimidischen Glas- und Kristallschnittarbeiten." *Schlesiens Vorzeit in Bild und Schrift,* n. s., 6 (1912), pp. 53–78.

Schnyder, R. "Keramik- und Glasfunde vom Takht-i Suleiman 1959–1968." In R. Naumann, D. Huff, and R. Schnyder, "Takht-i Suleiman: Bericht über die Ausgrabungen 1965–1973." *Archäologischer Anzeiger* 90 (1975), pp. 109–204; Schnyder's contribution, pp. 180–96.

Sellheim, Rudolf. "Vier Miszellen zur arabischen Sprichwörterkunde." *Oriens* 31 (1988), pp. 353–59.

7000 Years of Iranian Art. Exh. cat., Smithsonian Institution. Washington, D.C., 1964–65.

Shalem, Avinoam. "Fountains of Light: The Meaning of Medieval Islamic Rock Crystal Lamps." *Muqarnas* 11 (1994), pp. 1–11.
———. "New Evidence for the History of the Turquoise Bowl in the Treasury of San Marco." *Persica* 15 (1993–95).

Smith, Ray W[infield]. "Archaeological Evaluation of Analyses of Ancient Glass." In *Advances in Glass Technology: Sixth International Congress on Glass Sponsored by the International Commission on Glass with the Cooperation of the American Ceramic Society,* edited by Frederick R. Matson and Guy E. Rindone, vol. 2, pp. 283–90. New York, 1963.
———. "New Finds of Ancient Glass in North Africa." *Ars Orientalis* 2 (1957), pp. 91–117.

Soucek, Priscilla Parsons. *Islamic Art from The University of Michigan Collections.* Exh. cat., Kelsey Museum of Archaeology, The University of Michigan. Ann Arbor, 1978.

Spuler, Bertold. "Commerce IV: Before the Mongol Conquest." In *Encyclopedia Iranica,* vol. 6, fasc. 1, pp. 64–67. Costa Mesa, Cal., 1993.

Stavisky, B[oris] I[akovlevich]. "Samarkandskiye chernil'niye pribory IX–X vv. v Sobranii Ermitazha" (Inkwells from Samarkand of the IXth–Xth centuries in the Hermitage collections). *Sovetskaya Arkheologiya* 1 (1960), pp. 278–81.

Stronach, David, and T. Cuyler Young Jr. "Three Octagonal Seljuq Tomb Towers." *Iran* 4 (1966), pp. 1–20.

Sugiyama, J[irō]. *Ancient Glass from the Orient*. Exh. cat., National Museum. Tokyo, 1980. In Japanese and English.

Tait, Hugh, ed. *Glass, 5000 Years*. New York and London, 1991.

Terres secrètes de Samarcande: Céramiques du VIII^e au XIII^e siècle. Exh. cat., Institut du Monde Arabe, Paris, Musée de Normandie, Caen, Musée des Augustins, Toulouse. Paris, 1992.

3000 Jahre Glaskunst, see *3000 [Dreitausend] Jahre Glaskunst*.

Toulouse, Julian H. "Empontiling: A History." *The Glass Industry Newsletter* 49 (1968), pp. 137–42, 204–5.

The Treasury of San Marco, Venice. Exh. cat., The Metropolitan Museum of Art. New York and Milan, 1984.

A Tribute to Persia—Persian Glass. Exh. brochure, The Corning Museum of Glass. Corning, N.Y., 1972.

2000 Jahre persisches Glas, see *2000 [Zweitausend] Jahre persisches Glas*.

Upton, Joseph M. "In the Ruins of Nishapur." *Asia* 39, no. 8 (August 1939), pp. 445–49.

———. "The Persian Expedition, 1934–1935: Excavations at Nishapur." *Bulletin of The Metropolitan Museum of Art* 31, no. 9 (1936), pp. 176–80.

ʿŪsh, Muḥammad Abū-l-Faraj al-. "Incised Islamic Glass." *Archaeology* 24, no. 3 (June 1971), pp. 200–3.

ʿŪsh, Abū-l Faraj al-, Adnan Joundi, and Bachir Zouhdi. *Catalogue du Musée National de Damas*. Translated by G. Saadé. Damascus, 1969.

Volov, Lisa. "Plaited Kufic on Samanid Epigraphic Pottery." *Ars Orientalis* 6 (1966), pp. 107–33.

Watson, Oliver. *Persian Lustre Ware*. The Faber Monographs on Pottery and Porcelain. London, 1985.

Whitcomb, Donald S. *Before the Roses and Nightingales: Excavations at Qasr-i Abu Nasr, Old Shiraz*. New York, 1985.

———. "The City Istakhr and the Marvdasht Plain." *Akten des VII. Internationalen Kongresses für Iranische Kunst und Archäologie, München, 7. bis 12. September 1976. AMI*, suppl. vol. 6, pp. 363–70. Berlin, 1979. Article in English.

Whitehouse, David. "The Corning Ewer: A Masterpiece of Islamic Cameo Glass." *JGS* 35 (1993), pp. 48–56.

———. "Excavations at Sīrāf, First Interim Report." *Iran* 6 (1968), pp. 1–22.

———. "Excavations at Sīrāf: Third Interim Report." *Iran* 8 (1970), pp. 1–18.

———. "Islamic Glazed Pottery in Iraq and the Persian Gulf: The Ninth and Tenth Centuries." *Annali dell'Istituto Orientale de Napoli* 39 (1979), pp. 45–61.

Wilkinson, Charles K. "Christian Remains from Nishapur." In *Forschungen zur Kunst asiens: In memoriam Kurt Erdmann*, edited by Oktay Aslanapa and Rudolf Naumann, pp. 79–87. Istanbul, 1969. Article in English.

———. "Heating and Cooking in Nishapur." *Bulletin of The Metropolitan Museum of Art*, n. s., 2, no. 10 (1944), pp. 282–91.

———. "The Īrānian Expedition, 1936." *Bulletin of The Metropolitan Museum of Art* 32, no. 10 (1937), pp. 3–22.

———. "The Kilns of Nishapur." *Bulletin of The Metropolitan Museum of Art*, n. s., 17, no. 9 (1959), pp. 235–40.

———. "Life in Early Nishapur." *Bulletin of The Metropolitan Museum of Art*, n. s., 9, no. 2 (1950), pp. 60–72.

———. "Life in the Early Islamic City of Nishapur, Persia." *Transactions of The New York Academy of Sciences*, 2d ser., 12, no. 2 (1949), pp. 66–77.

———. *Nishapur: Pottery of the Early Islamic Period*. Greenwich, Conn., 1973.

———. *Nishapur: Some Early Islamic Buildings and Their Decoration*. New York, 1986.

———. "Water, Ice, and Glass." *Bulletin of The Metropolitan Museum of Art*, n. s., 1, no. 5 (1943), pp. 175–83.

Williamson, Andrew. "Regional Distribution of Medieval Persian Pottery in the Light of Recent Investigations." In *Syria and Iran: Three Studies in Medieval Ceramics*, edited by James Allan and Caroline Roberts, pp. 11–22. Oxford Studies in Islamic Art, 4. Oxford, 1987.

Wulff, Hans E. *The Traditional Crafts of Persia: Their Development, Technology, and Influence on Eastern and Western Civilizations*. Cambridge, Mass., 1966.

Zhu Qixin. "Buddhist Treasures from Famensi: The Recent Excavation of a Tang Underground Palace." *Orientations* 21, no. 5 (1990), pp. 77–83.

2000 [Zweitausend] Jahre persisches Glas. Exh. cat., Städtisches Museum, Brunswick, Germany. 1963.

Index